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Jeff Harrison, EIC 2800 Team Leader
571-272-2511, JEF 4B68

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  - ☐ Helped examiner better understand the invention.
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  Types of relevant prior art found:
  - ☐ Foreign Patent(s)
  - ☐ Non-Patent Literature
    (journal articles, conference proceedings, new product announcements etc.)
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sira
Search and Information Resources Administration

9/9/5 (Item 5 from file: 350)
DIALOG(R)File 350:Derwent WPIX

009949155
WPI Acc No: 1994-216868/199426
XRPX Acc No: N94-171354
Method for assessing of task processing style of individual - defining of simulated situation for individual with scenario data, which are presented to him on computer controlled display device
Patent Assignee: INTROSPECT TECHNOLOGIES INC (INTR-N); MARIHUGH S (MARI-I)
Inventor: MARIHUGH S; OSTBY D L; OSTBY P S
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	**Kind**	**Date**	**Applicat No**	**Kind**	**Date**	**Week**	
US 5326270	**A**	**19940705**	**US 91751548**	**A**	**19910829**	**199426**	**B**

Priority Applications (No Type Date): US 91751548 A 19910829
Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5326270	A		42	G09B-007/00	

Abstract (Basic): US 5326270 A

The method involves presenting a simulated situation and recording the individual's responses while resolving the situation. A subject undergoing the assessment is asked to assume the responsibilities of an Assistant Superintendent of Parks, replacing an individual who has unexpectedly left that position. The subject is first trained in the use of a touch-sensitive screen display for accessing data that may be useful in fulfilling the responsibilities of the simulated position and for providing input data used in the exercise.

Each action by the subject undergoing the assessment is recorded in a raw data stream, along with the time that it occurred, and is **statistically analyzed with respect to several parameters** that define the subject's task-processing style. These parameters are useful in determining whether an individual is suitable for a job and for other assessment purposes, or can be used for training a subject to improve the subject's ability and efficiency in dealing with tasks.

USE/ADVANTAGE - For psychological testing of individual's response and behaviour when presented with problem. Provision for training person, providing solution how person solves problems.

Dwg.2,3/12

Title Terms: METHOD; ASSESS; TASK; PROCESS; STYLE; INDIVIDUAL; DEFINE; SIMULATE; SITUATE; INDIVIDUAL; DATA; PRESENT; COMPUTER; CONTROL; DISPLAY; DEVICE
Derwent Class: P85; S05; T01; W04
International Patent Class (Main): G09B-007/00
File Segment: EPI; EngPI
Manual Codes (EPI/S-X): S05-D01C5A; T01-J03; T01-J12A; W04-W07

9/9/4 (Item 4 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014433282
WPI Acc No: 2002-253985/200230
Related WPI Acc No: 1999-120266; 2004-060849
XRPX Acc No: N02-196090
Application software package installation for local area network, involves generating application installation package based on differences between pre-installation and post-installation system snap-shots of software
Patent Assignee: INTEL CORP (ITLC)
Inventor: LUU L
Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6324690	**B1**	**20011127**	**US 93130097**	**A**	**19930930**	**200230**	**B**
			US 96591222	A	19960118		
			US 97859277	A	19970519		
			US 98127116	A	19980729		

Priority Applications (No Type Date): US 93130097 A 19930930; US 96591222 A 19960118; US 97859277 A 19970519; US 98127116 A 19980729
Abstract (Basic): US 6324690 B1

NOVELTY - An application installation package is generated based on differences between pre-installation and post-installation system snap-shots of software on source workstation (201). The package is installed on the user workstation (202) based on application installation package and default personality file received from the source workstation. The default personality file describes default installation **parameters** for the software package.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) Computer system;

(b) Recorded medium with application software package installation program

USE - For local area network.

ADVANTAGE - Allows a LAN administrator to install application software on user's workstation automatically at any time without user's intervention.

DESCRIPTION OF DRAWING(S) - The figure shows the block diagram of the local area network administrator workstation and user workstation.

Source workstation (201)

User workstation (202)

pp; 49 DwgNo 3/6

Title Terms: APPLY; SOFTWARE; PACKAGE; INSTALLATION; LOCAL; AREA; NETWORK; GENERATE; APPLY; INSTALLATION; PACKAGE; BASED; DIFFER; PRE; INSTALLATION; POST; INSTALLATION; SYSTEM; SNAP; SHOT; SOFTWARE
Derwent Class: T01; W01
International Patent Class (Main): **G06F-011/30**
File Segment: EPI
Manual Codes (EPI/S-X): T01-F05B2; T01-N01D3; T01-N02A2A; T01-S03; W01-A06E

9/9/3 (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014622459
WPI Acc No: 2002-443163/200247
Related WPI Acc No: 2003-353423; 2005-495253
XRPX Acc No: N02-349104

Electric circuit conductor inspection apparatus creates inspection attribute of cross section configuration of conductor by sensing reflectivity and luminescence at conductor location

Patent Assignee: ORBOTECH LTD (ORBO-N)
Inventor: MARKOV I; SAVAREIGO N
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 20020039182	**A1**	**20020404**	**US 2000237803**	**P**	**20001004**	**200247**	**B**
			US 2001939682	**A**	**20010828**		

Priority Applications (No Type Date): US 2000237803 P 20001004; US 2001939682 A 20010828

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 20020039182	A1		15	G01N-021/00	Provisional application US 2000237803

Abstract (Basic): US 20020039182 A1

NOVELTY - The inspection apparatus senses the reflectivity and luminescence at the conductor location to determine the top width dimension and bottom width dimension respectively, to create an inspection attribute of cross section configuration of the conductor using an impedance analyzer.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(a) Electrical circuit inspection method;

(b) Method for manufacturing electrical circuit

USE - Used in the field of electric circuit inspection especially during PCB manufacture.

ADVANTAGE - By determining the top and bottom width dimension, any defect in manufacturing process to fabricate an electrical circuit can be determined. Comparison of the respective widths of the bottom and top surfaces of conductor provides an indication of the slope of the side walls of the conductor. **Statistical** information about uniformity in the widths of conductors along top and bottom surfaces is used to indicate flaws in etching process.

DESCRIPTION OF DRAWING(S) - The figure shows the functional block diagram of automated optical inspection system to inspect electrical circuits for defects.

pp; 15 DwgNo 1/9

Title Terms: ELECTRIC; CIRCUIT; CONDUCTOR; INSPECT; APPARATUS; INSPECT; ATTRIBUTE; CROSS; SECTION; CONFIGURATION; CONDUCTOR; SENSE; REFLECT; LUMINESCENT; CONDUCTOR; LOCATE
Derwent Class: T01; V04
International Patent Class (Main): G01N-021/00
File Segment: EPI
Manual Codes (EPI/S-X): T01-J08F; V04-R06J

9/9/2 (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014814065
WPI Acc No: 2002-634771/200268
XRPX Acc No: N02-501355
Multi-tier client/server system comprises clients having browsers for processing documents and maintaining connectivity with relational database servers and for executing application logic
Patent Assignee: SARKAR S S (SARK-I)
Inventor: SARKAR S S
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6418448	**B1**	**20020709**	**US 99455422**	**A**	**19991206**	**200268**	**B**

Priority Applications (No Type Date): US 99455422 A 19991206
Abstract (Basic): US 6418448 B1

NOVELTY - Several clients have browsers for processing documents in XML and RDF, for creating and maintaining thin client windows on demand for persistent connectivity through the internet. Relational database servers with application logic in form of object packages comprise user defined packages and method and operator interfaces. The object request broker services execute application logic in CORBA.

DETAILED DESCRIPTION - The relational database servers comprise user defined packages for providing call specifications for set of interfaces to embed in SQL queries, for **specifying operations over attribute values from multiple tables, for specifying interfaces where parameter type definition maps to another interface or to tables, and user defined packages where uniform resource identifiers are used to locate elements in schema objects.**

USE - Multi-tier client server system for navigating, querying and manipulating information using specifications in resource description frame work and supporting multiple object relational database resources over the web.

ADVANTAGE - Triggers queries for transactions through thin client windows for persistent communication with remote databases.

DESCRIPTION OF DRAWING(S) - The figure shows the block diagram illustrating a single SQL query made over the relational database schema along with legacy and existing central databases.

pp; 39 DwgNo 20/20

Title Terms: MULTI; TIER; CLIENT; SERVE; SYSTEM; COMPRISE; CLIENT; PROCESS; DOCUMENT; MAINTAIN; CONNECT; RELATED; DATABASE; SERVE; EXECUTE; APPLY; LOGIC
Derwent Class: T01
International Patent Class (Main): **G06F-017/30**
File Segment: EPI
Manual Codes (EPI/S-X): T01-J05B4B; T01-J05B4C; T01-N02A3C; T01-N03A1; T01-N03B2

9/9/1 (Item 1 from file: 350)
DIALOG(R)File 350:Derwent WPIX

014833893
WPI Acc No: 2002-654599/200270
Related WPI Acc No: 1999-394065; 2001-167633; 2003-075360
XRPX Acc No: N02-517140
Information distribution apparatus for e-commerce, receives response message, transmits another request message to product information resource and product information is sent to computer for inspection by requester
Patent Assignee: CALL C G (CALL-I)
Inventor: CALL C G
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 6418441	**B1**	**20020709**	**US 9849426**	**A**	**19980327**	**200270**	**B**

Priority Applications (No Type Date): US 99316597 A 19990521; US 9849426 A 19980327; US 2000621662 A 20000724
Abstract (Basic): US 6418441 B1
NOVELTY - A web browser program specifies barcode of product by transmitting a request message containing **parameter** value to internet domain name system based on which system accesses the database and transmits a response message containing an internet address to the computer. The program receives response message, transmits another request message to system and product information is returned to computer for inspection.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:
(1) Retail sales performing apparatus; and
(2) Internet shoppers provision method.
USE - For e-commerce related to food products, cosmetics, health care products, pharmaceuticals.
ADVANTAGE - The company code portion of the universal product code is stored in cross-reference database, and the remaining product code is sent to manufacturer's server, thereby the size of the cross-referencing database is reduced and maintenance of database is simplified, efficiently and reliably.
DESCRIPTION OF DRAWING(S) - The figure shows a diagram illustrating the inter-relationship of the principle data structure used to implement a product code translator.
pp; 27 DwgNo 2/8
Title Terms: INFORMATION; DISTRIBUTE; APPARATUS; RECEIVE; RESPOND; MESSAGE; TRANSMIT; REQUEST; MESSAGE; PRODUCT; INFORMATION; RESOURCE; PRODUCT; INFORMATION; SEND; COMPUTER; INSPECT
Derwent Class: T01
International Patent Class (Main): **G06F-017/60**
File Segment: EPI
Manual Codes (EPI/S-X): T01-N01A2

74/9/3 (Item 3 from file: 350)
DIALOG(R)File 350:Derwent WPIX

010895940
WPI Acc No: 1996-392891/199639
Related WPI Acc No: 1996-341806
XRPX Acc No: N96-331134

Spectral null sequences detecting method in communication channel - involves mapping each spectral null sequence to unique path of a cyclic successive states and edges through trellis by selectively outputting splitting counterpart states

Patent Assignee: INT BUSINESS MACHINES CORP (IBMC)
Inventor: FREDRICKSON L; KARABED R; SIEGEL P H; THAPAR H K
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	**Kind**	**Date**	**Applicat No**	**Kind**	**Date**	**Week**	
US 5548600	A	19960820	US 94289811	A	19940812	199639	B
			US 94316597	A	19940929		

Priority Applications (No Type Date): US 94316597 A 19940929; US 94289811 A 19940812
Abstract (Basic): US 5548600 A

The method involves tracking the spectral content of a sequences of electrical signals with a Viterbi detector. The processing of the sequences by the Viterbi detector is governed according to an N stage trellis structure. Each spectral null sequence is mapped to a unique path of a cyclic successive states and edges through the trellis by selectively outputting splitting counterpart states. Pre-selected states and edges are pruned at pre-selected times module N in the trellis such that no pair of unique paths support the same spectral null sequence. A time-varying trellis structure are created for limiting the maximum length of dominant error events in the sequences.

ADVANTAGE - Reduces complexity of method and device for generating and detecting matched spectral null (MSN) coded sequences. Generates and detect MSN sequences with constrains against quasi-catastrophic sequences without requiring substantial path memory to assure high **probability** of survivor path merging.

Dwg.11/13

Title Terms: SPECTRAL; NULL; SEQUENCE; DETECT; METHOD; COMMUNICATE; CHANNEL ; MAP; SPECTRAL; NULL; SEQUENCE; UNIQUE; PATH; CYCLIC; SUCCESSION; STATE; EDGE; THROUGH; TRELLIS; SELECT; OUTPUT; SPLIT; COUNTERPART; STATE
Derwent Class: T01; U21; W01
International Patent Class (Main): G06F-011/10
International Patent Class (Additional): H03M-013/12
File Segment: EPI
Manual Codes (EPI/S-X): T01-G01A1; U21-A06; W01-A01B2; W01-A02

74/9/2 (Item 2 from file: 350)
DIALOG(R)File 350:Derwent WPIX

012140075
WPI Acc No: 1998-556987/199847
XRPX Acc No: N98-434241
Duplicatable magnetic tape media creation method - involves copying required data in source media onto destination media without copying padding data
Patent Assignee: EMC CORP (EMCE-N)
Inventor: MUTALIK M G
Number of Countries: 001 Number of Patents: 001
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
US 5819297	**A**	**19981006**	**US 95534433**	**A**	**19950927**	**199847**	**B**

Priority Applications (No Type Date): US 95534433 A 19950927
Abstract (Basic): US 5819297 A

The method involves creating a source media having a predetermined percentage of its capacity filled with padding data. The required data is stored in the source media. The required data in source media is then copied onto a destination media without copying padding data.

ADVANTAGE - Creates duplicate tape media that do not have padding data reliably. Enables working with existing drive technology and input-output software drivers and label recorders. Enhances **probability** of fitting data onto tape media.

Dwg.1/5

Title Terms: MAGNETIC; TAPE; MEDIUM; CREATION; METHOD; COPY; REQUIRE; DATA; SOURCE; MEDIUM; DESTINATION; MEDIUM; COPY; PAD; DATA
Derwent Class: T01
International Patent Class (Main): G06F-017/30
File Segment: EPI
Manual Codes (EPI/S-X): T01-C01; T01-J05B2B

74/9/1 (Item 1 from file: 6)
DIALOG(R)File 6:NTIS

1468526 NTIS Accession Number: NTN89-0830
System-Reliability Cumulative-Binomial Program: This program finds the probability required to yield a given system reliability
(NTIS Tech Note)
National Aeronautics and Space Administration, Washington, DC.
Corp. Source Codes: 011249000
Oct 89 1p
Languages: English
Journal Announcement: GRAI9001
FOR ADDITIONAL INFORMATION: Contact: COSMIC, 112 Barrow Hall, University of Georgia, Athens, GA 30602; (404) 542-3265. Refer to NPO-17556/TN.
NTIS Prices: Not available NTIS
Country of Publication: United States

This citation summarizes a one-page announcement of technology available for utilization. The cumulative-binomial computer program, NEWTONP, is one of a set of three programs that calculate cumulative binomial probability distributions for arbitrary inputs. The three programs, NEWTONP, CUMBIN (NPO-17555), and CROSSER (NPO-17557), can be used independently of one another. NEWTONP can be used by statisticians and users of statistical procedures, test planners, designers, and numerical analysts. The program has been used for **calculations of reliability and availability**. NEWTONP calculates the probability p required to yield a given system reliability V for a k-out-of-n system. It can also be used to determine the Clopper-Pearson confidence limits (either one-sided or **two**-sided) for the **parameter** p of a Bernoulli distribution. NEWTONP can also be used to determine Bayesian probability limits for a proportion (if the beta prior has positive integer parameters), the percentiles of incomplete beta distributions with positive integer parameters, the percentiles of F distributions in which both degrees of freedom are even, and the median **plotting** positions in **probability plotting**. The NEWTONP program is written in C. It was developed on an IBM AT computer with a numeric coprocessor using **Microsoft** C 5.0. The format of the program is interactive. It has been implemented under DOS 3.2 and has a memory requirement of 26K.

Descriptors: *Software; ***Probability** distribution **functions**; *Reliability
Identifiers: *Computer calculations; NTISNTND
Section Headings: 72F (Mathematical Sciences--Statistical Analysis); 62B (Computers, Control, and Information Theory--Computer Software)

. 9/3,AB,CM/8 (Item 2 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00967886
PORT MIRRORING IN CHANNEL DIRECTORS AND SWITCHES
Patent Applicant/Assignee:
INRANGE TECHNOLOGIES CORPORATION
Patent Applicant/Inventor:
WOODRING Sherrie L, 3987 Farrcroft Drive, Fairfax, VA 22030, US, US
Patent and Priority Information (Country, Number, Date):
Patent: WO 2002101987 A2-A3 20021219 (WO 02101987)
Priority Application: US 2001297439 20010613

English Abstract
A storage area network that includes a monitoring component, wherein the monitoring component is capable of characterizing data flowing into or out of at least one port associated with a fiber channel director or switch so as to enable an operator to ascertain some usable information regarding the characterized data and/or its impact on the network. In many embodiments, the monitoring component provides a visual or audible signal to the operator regarding a particular data component. The present invention is further directed to methods for monitoring a storage area network, in particular, at least one port associated therewith.

Claim
A probe system adapted for use in a channel director comprising:
at least one probe being capable of being associated with at least one port associated with said channel director;
a mechanism for copying all ingress and egress data to/from a fiber channel port to the said probe for analysis.
2 A probe system as claimed in claim 1, wherein said channel director is a storage area network.
3 A probe system as claimed in claim 2, wherein said storage area network includes a fibre channel architecture.
4 A probe system as claimed in claim 2, wherein said mechanism comprises a mirroring capability to copy the data associated with said port to said probe.
5 A probe system as claimed in claim 1, wherein said probe is a software device.
6 A probe system as claimed in claim 1, wherein said probe is a hardware device.
7 A probe system as claimed in claim 1, wherein said mechanism reflects an optical energy signal on the transmit side of the port, wherein said optical energy is transmitted to said probe.
8 A probe system as claimed in claim 7, wherein approximately 10 percent of said optical energy signal is reflected.
9 A probe system as claimed in claim 1, wherein said mechanism reflects an optical energy signal on the receive side of a port, wherein said optical energy is transmitted to said probe.
10 A probe system as claimed in claim 9, wherein approximately 10 percent of said optical energy signal is reflected.
11 A probe system as claimed in claim 1, wherein said mechanism is an external fibre channel patch panel that replicates data for a given fibre channel port to said port.
12 A probe system as claimed in claim 1, wherein said mechanism accomplishes an internal replication of data within a switch to a probe.
13 A probe system as claimed in claiml, wherein said mechanism accomplishes an internal replication of data within a director to said probe.
14 A method for monitoring data ingress and egress in a storage area network comprising: providing at least one probe on at least one port associated with a device in said storage area network; mirroring a portion of a signal ingress and/or egress associated with said port using said probe to a monitoring location; obtaining information regarding data ingress and/or data egress obtained using said mirrored signal.
15. A method as claimed in claim 14, further comprising generating **statistics** on the information provided by said probe.
16. A method as claimed in claim 15, further comprising viewing said **statistics**.

9/3,AB,CM/7 (Item 1 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

01057890
METHOD AND APPARATUS FOR RESTRICTING ACCESS TO A DATABASE ACCORDING TO USER PERMISSIONS
Patent Applicant/Assignee:
HPL TECHNOLOGIES INC, Suite 400, 2033 Gateway Place, San Jose, CA 95110,
Inventor(s):
GHUKASYAN Hovhannes, 155 Pacchetti Way, Mountain View, CA 94040, US,
Patent and Priority Information (Country, Number, Date):
Patent: **WO 200388084 A1 20031023 (WO 0388084)**
Priority Application: US 2002115196 20020402
English Abstract
A method and apparatus for restricted access to a database according to user permissions are described. A user permissions file (1007) residing on a server includes information of permissions related to database records, and which of those permissions are associated with individual users. A permissions manager (1006) also residing on the server manages user queries (1002) either directly by generating restricted queries (1008) that reflect only authorized access to database records for the user generating the query, or indirectly by downloading a permissions filter or information for a restricted **parameters** screen to the user's client, so as to generate the restricted query (1008) on the client. In any case, a database management system (1001) residing on the server receives the restricted query (1008) and generates a result (1003) by accessing only authorized database records for the user, and communicates the result (1003) back to the user's cleint.
Claim
26. A method for restricting access to a database according to user permissions, comprising:
receiving a user identification provided by a user;
generating information for a restricted **parameters** screen from information associated with said user identification so as to generate a restricted query through user selection of available options limited by tables, columns and records accessible to said user in a database;
and providing said information for said restricted **parameters** screen so as to be made available to said user as part of an interface between said user and a database management system.
27. The method according to claim 26, wherein said information for said restricted **parameters** screen comprises **parameters** information provided to said user interface so that said user interface displays said available options limited by tables, columns and records accessible to said user.
28. An apparatus for restricting access to a database according to user permissions, comprising a server computer including a database and a database management system, said server computer configured to:
receive a user identification associated with a user from a client computer; generate information for a restricted **parameters** screen from information associated with said user identification so as to generate a restricted query through selection by a user of said client computer of available options limited by tables, columns and records accessible to said user in a database; and
download said information for said restricted **parameters** screen to said client computer to be made available to said user as part of an interface between said user and said database management system.

66/9/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

07884800 INSPEC Abstract Number: A2001-09-4255P-024, B2001-05-4320J-029
Title: Thermodynamic balance in quantum dot lasers
Author(s): Summers, H.D.; Thomson, J.D.; Smowton, P.M.; Blood, P.; Hopkinson, M.
Author Affiliation: Dept. of Phys. & Astron., Cardiff Univ., UK
Journal: Semiconductor Science and Technology vol.16, no.3 p.140-3
Publisher: IOP Publishing,
Publication Date: March 2001 Country of Publication: UK
CODEN: SSTEET ISSN: 0268-1242
SICI: 0268-1242(200103)16:3L.140:TBQL;1-0
Material Identity Number: J690-2001-003
U.S. Copyright Clearance Center Code: 0268-1242/2001/030140+04$30.00
Document Number: S0268-1242(01)16684-8
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T); Experimental (X)
Abstract: The spontaneous emission and optical gain spectra from an InGaAs quantum dot laser have been independently measured under the same operating conditions.
Using these spectra a **combined probability-distribution function** describing the electron occupancy in the conduction and valence bands has been experimentally determined. Comparison of this **function** with theoretical **curves** based on Fermi-Dirac statistics shows that for temperatures down to 100 K the carrier occupancy statistics are accurately described by thermal distributions. Measurements at 70 K show a breakdown of thermodynamic equilibrium indicated by non-thermal carrier distributions. (12 Refs)

62/9/2 (Item 2 from file: 6)
DIALOG(R)File 6:NTIS

0685636 NTIS Accession Number: N78-16044/7/XAB

Characterization of Nongaussian Atmospheric Turbulence for Prediction of Aircraft Response **Statistics**

(Final Report)

Mark, W. D.

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.

Report No.: NASA-CR-2913; REPT-3496

Dec 77 138p

Journal Announcement: GRAI7811; STAR1607

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NTIS Prices: PC A07/MF A01

Contract No.: NAS1-14413

Mathematical expressions were derived for the **exceedance** rates and **probability** density **functions** of aircraft response **variables** using a turbulence model that consists of a low frequency component plus a variance modulated Gaussian turbulence component. The **functional** form of experimentally observed concave exceedance **curves** was predicted theoretically, the strength of the concave contribution being governed by the coefficient of variation of the time fluctuating variance of the turbulence. Differences in the **functional** forms of response exeedance **curves** and **probability** densities also were shown to depend primarily on this same coefficient of variation. Criteria were established for the validity of the local stationary assumption that is required in the derivations of the **exceedance** **curves** and **probability** density **functions**. These criteria are shown to depend on the relative time scale of the fluctuations in the variance, the fluctuations in the turbulence itself, and on the nominal duration of the relevant aircraft impulse response function. Metrics that can be generated from turbulence recordings for **testing** the validity of the local stationary assumption were developed.

Descriptors: *Aircraft performance; *Atmospheric turbulence; *Gusts; Mathematical models; Atmospheric circulation; Earth atmosphere; **Probability** density **functions**

Identifiers: NTISNASA

Section Headings: 51A (Aeronautics and Aerodynamics--Aerodynamics); 51C (Aeronautics and Aerodynamics--Aircraft)

62/9/1 (Item 1 from file: 6)
DIALOG(R)File 6:NTIS

0710640 NTIS Accession Number: AD-A055 611/8/XAB
Estimation of the Operating Characteristics of Item Response Categories II: **Further Development of the Two-Parameter Beta Method**
(Technical rept)
Samejima, F.
Tennessee Univ Knoxville Dept of Psychology
Corp. Source Codes: 404225
Report No.: RR-78-1
May 78 127p
Journal Announcement: GRAI7820
See also Rept. no. RR-77-1, AD-A049 618.
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NTIS Prices: PC A07/MF A01
Contract No.: N00014-77-C-0360; RR04204; RR0420401
The Two-Parameter Beta Method, introduced in the previous study as a method of estimating the **operating characteristics of a test item**, has proved to be as efficient as the Normal Approximation Method, for a set of simulated data of 500 hypothetical examinees having a uniform latent trait distribution between -2.475 and 2.475. Both methods are characterized: (1) by the use of a relatively small number of subjects-like 500 -- in the whole procedure of estimation; (2) without assuming any prior mathematical model; and (3) by the use of the estimated joint distribution of the latent trait and its **maximum** likelihood estimate. In the Two-Parameter Beta Method, the method of moments is adopted to approximate the **probability** density **function** of the **maximum** likelihood estimate, using polynomials of degree 3 and 4. The first two conditional moments of the latent trait, given the **maximum** likelihood estimate, are derived from theory and computed for the data for each value of the **maximum** likelihood estimate. The conditional distribution of the latent trait, given the **maximum** likelihood estimate, is approximated by a Beta distribution using the method of moments, with two a priori set **parameters** and two estimated **parameters** from the conditional moments.
Descriptors: ***Statistical tests**; Psychological **tests**; **Statistical** distributions; Operators(Mathematics); **Test** construction(Psychology); Parametric analysis; **Curve fitting**; Estimates; **Probability** density **functions**
Identifiers: Latent trait calibration; **Maximum** likelihood estimation; NTISDODXA
Section Headings: 92B (Behavior and Society--Psychology); 72F (Mathematical Sciences--Statistical Analysis)

50/9/3 (Item 1 from file: 95)
DIALOG(R)File 95:TEME-Technology & Management

01342578 I99091140300
Robust OCR of degraded documents
Natarajan, P; Bazzi, I; Zhidong Lu; Makhoul, J; Scwhartz, R
GTE Corp., Cambridge, MA, USA
Proceedings of the Fifth International Conference on Document Analysis and Recognition. ICDAR '99 (Cat. No.PR00318), **20-22 Sept. 1999**, Bangalore, India1999
Document type: Conference paper Language: English
Record type: Abstract
ISBN: 0-7695-0318-7

ABSTRACT:
This paper is concerned with techniques for performing robust OCR of degraded documents, such us faxed text, using a hidden Markov model (HMM) based OCR system. We present two strategies for dealing with degraded documents. The first strategy is to train the system on degraded documents that have been subjected to the same, or similar, degradation process as the documents to be recognized. The second, more sophisticated, strategy is to use adaptation to **adjust** the **parameters** of the trained model in order to improve recognition accuracy on a specific document. This **adjustment** of model **parameters** is typically posed as a constrained **optimization** problem wherein a certain prespecified objective function is to be **optimized**. We present a comparative study of two objective functions. The **likelihood function** and the posterior **probability**. A variation of the basic posterior **probability** method is also discussed. Using adaptation with a model trained on fax-degraded data we have reduced, by a factor of three, the character error rate on fax-degraded text images generated from the University of Washington English Image Database I.

DESCRIPTORS: IMAGE PROCESSING; FACSIMILE; OCR--OPTICAL CHARACTER RECOGNITION; LIKELIHOOD; EDUCATIONAL COURSES; **TARGET** FUNCTION; **PROBABILITY FUNCTION**
IDENTIFIERS: VERBORGENES MARKOV MODELL; ERKENNUNGSGENAUIGKEIT; FOLGENDE WAHRSCHEINLICHKEIT; Document Imaging; Bildverarbeitung

50/9/1 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

06480772 INSPEC Abstract Number: C9703-1210B-001
Title: Quantitative fault tree analysis using binary decision diagrams
Author(s): Sinnamon, R.M.; Andrews, J.D.
Author Affiliation: Dept. of Math. Sci., Loughborough Univ. of Technol., UK
Journal: RAIRO-APII-JESA Journal Europeen des Systemes Automatises vol.30, no.8 p.1051-71
Publisher: Editions Hermes,
Publication Date: 1996 Country of Publication: France
CODEN: RJEAF5 ISSN: 0296-1598
SICI: 0296-1598(1996)30:8L.1051:QFTA;1-B
Material Identity Number: F165-97002
Language: English Document Type: Journal Paper (JP)
Treatment: Theoretical (T)
Abstract: Fault tree quantification enables not only the **probability** of the top event to be calculated but in addition its failure rate, expected number of occurrences and also importance measures which signify the contribution each basic event makes to system failure. Due to the large number of failure **combinations** (**minimal** cut **sets**) it is not possible using conventional techniques to calculate these **parameters** exactly and approximations are required. Most of the approximations rely on the basic events having a small likelihood of occurrence. When this condition is not met it results in large inaccuracies. These problems can be overcome by employing the binary decision diagram (BDD) approach. This method converts the fault tree diagram to a format which encodes Shannon's decomposition and allows the exact failure **probability** to be determined in a very efficient calculation procedure. By making use of the system **probability function** to obtain the criticality function other top event **parameters** as well as component **importance** measures can be calculated. This paper describes how the BDD method can be employed in fault tree quantification. (10 Refs)
Subfile: C
Descriptors: Boolean functions; decision theory; encoding; fault trees; **probability**; reliability theory
Identifiers: quantitative fault tree analysis; binary decision diagrams; failure **probability**; reliability theory; Shannon decomposition; encoding; criticality function; Boolean function; **minimal** cut **sets**
Class Codes: C1210B (Reliability theory); C1160 (Combinatorial mathematics); C4210 (Formal logic); C1140E (Game theory)

123 PROBABILIT???????
S14 1 ADJUST?????(4N)PROBABILIT???????
? t s14/9/all

14/9/1
DIALOG(R)File 256:TecInfoSource

01086436 DOCUMENT TYPE: Product
PRODUCT NAME: Unicenter Performance Management (086436)
Computer Associates International Inc (081957)
1 Computer Associates Plaza
Islandia, NY 11749 United States
TELEPHONE: (631) 342-6000
RECORD TYPE: Directory
CONTACT: Sales Department

2002-05-30 00:00:00 Computer Associates' Unicenter (R) Performance Management offers end-to-end performance management, incorporating predictive management capabilities for early problem detection and prevention. Using adaptive pattern recognition and neural network techniques, it predicts effects of changing system characteristics such as fluctuating workload, system activity, and memory utilization on system performance. U.S. patented Neugents (TM) technology learns normal operating behavior by monitoring the system running conventional workloads and analyzing historical performance data. Data modeling and pattern matching are used to build a Personality Profile uniquely tuned to the operating characteristics of the machine. This product can also be updated to incorporate changes in machine hardware, software, or usage. A single profile can be applied to a series of machines for enterprisewide deployment. Comparing current operating conditions with the Profile enables Neugents technology to identify unique circumstances and subtle abnormalities. The historical data can be reviewed to confirm the Personality Profile configuration will identify real error situations and deliver accurate problem prediction. In addition, Neugents technology can detect new behavioral patterns. If the system configuration is altered, these predictive agents can learn a new Personality Profile. Moreover, Unicenter Performance Management is highly customizable, so users can **adjust** the **probability** at which predicted errors are alerted.

DESCRIPTORS: Capacity Planning; Computer Diagnostics; Data Center Operations; Load Balancing; Network Administration; Network Management; Network Software; Neural Networks; Pattern Recognition; Performance Monitors; Software Agents; System Monitoring;

HARDWARE: **Apple Macintosh**; HP; IBM 390; IBM Mainframe; IBM PC & Compatibles; Sun; UNIX
OPERATING SYSTEM: HP-UX; Linux; MacOS; OS/390; Solaris; UNIX; Windows NT/2000
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Mini; Micro; Workstation
POTENTIAL USERS: Cross Industry, Data Centers

11/9/1
DIALOG(R)File 256:TecInfoSource

01209945 DOCUMENT TYPE: Product

PRODUCT NAME: Statistix for Windows 7 (209945)

Analytical Software (416576)
PO Box 12185
Tallahassee, FL 32317 United States
TELEPHONE: (850) 893-9371

RECORD TYPE: Directory

CONTACT: Sales Department

Statistix for Windows 7 from Analytical Software is a comprehensive, menu-driven statistical program that performs all of the basic and advanced statistical procedures needed by most users. It offers descriptive statistics, t-tests, non-regression analysis, ANOVA, statistical process control (SPC) charts, contingency tables, time series, data management, association tests, and linear models. Statistix features regression, analysis of variance, **probability functions**, sample tests, and randomness and normality tests. Users can import data from spreadsheet, database, and text files. They can produce and export publication-quality graphs and charts.

DESCRIPTORS: Regression Analysis; Research & Development; Statistics; Time Series

HARDWARE: IBM PC & Compatibles
OPERATING SYSTEM: Windows; Windows NT/2000; Windows XP
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Micro
POTENTIAL USERS: Researchers
DATE OF RELEASE: 01/1985
PRICE: $495; includes unlimited support; Internet trial available

NUMBER OF INSTALLATIONS: 30000
DOCUMENTATION AVAILABLE: User manuals
TRAINING AVAILABLE: Telephone support; technical support; e-mail support
REVISION DATE: 20030708

9/9/11
DIALOG(R)File 256:TecInfoSource

01567914 DOCUMENT TYPE: Product

PRODUCT NAME: NeuralWorks Predict 3.0 (567914)

NeuralWare Inc (447439)
230 E Main St #200
Carnegie, PA 15106-2700 United States
TELEPHONE: (412) 278-6280

RECORD TYPE: Directory

CONTACT: Sales Department

NeuralWorks Predict 3.0, formerly NeuralSIM, from NeuralWare is a development environment for creating and deploying neural network-based applications. NeuralSIM combines neural network technology with **statistics**, genetic algorithms, and fuzzy logic to determine the best solutions to problems. It has applications in modeling, forecasting, classification, industrial inspection, process control, stock market timing, and classification applications. NeuralWorks helps developers create effective models. It analyzes data, transforms data, and selects the options and training methods to **optimize** a model. Its two proprietary training algorithms can process clean or noisy data. More than 200 **parameters** give developers control over modeling. NeuralWorks Predict's seamless interface to Microsoft (R) Excel means that users can collect model data in Excel spreadsheets. They can work with the familiar Excel interface much of the time. The three-level interface lets users choose the level that is suitable for them. Features of NeuralWorks Predict include wizards and online context-sensitive help; useful default settings; special features to improve deployment; genetic variable selection to solve difficult problems; diagnostics to verify models; interfaces to, and generation of code in, Visual Basic, Fortran, and C; and a run-time system. The major components are Data Transformation, Data Selection, Network Training, Variable Selection, and Code Generation. The Data Transformation component can analyze and transform fuzzy transforms, nonlinear transforms, and enumerated types.

DESCRIPTORS: Artificial Intelligence; Expert Systems; Fuzzy Logic; Genetic Algorithms; Models; Neural Networks; Program Development
HARDWARE: IBM PC & Compatibles; IBM RS/6000; Silicon Graphics; Sun; UNIX
OPERATING SYSTEM: AIX; Excel; IRIX; Linux; Solaris; UNIX; Windows; Windows NT/2000; Windows XP
PROGRAM LANGUAGES: C; C++; Fortran; Visual Basic
TYPE OF PRODUCT: Mini; Micro; Workstation
POTENTIAL USERS: Cross Industry, Simulation, Developers
PRICE: $2,495 and up; depends on platform
DOCUMENTATION AVAILABLE: Online documentation; tutorials
TRAINING AVAILABLE: Technical support; telephone support
OTHER REQUIREMENTS: 4MB RAM; 80386+ CPU; EGA+ graphics; 5MB disk space; Excel 7 or 97;
REVISION DATE: 20030917

9/9/16
DIALOG(R)File 256:TecInfoSource

01304603 DOCUMENT TYPE: Product

PRODUCT NAME: Design-Ease 6 (304603)

Stat-Ease Inc (494984)
2021 E Hennepin Ave
Minneapolis, MN 55413-2726 United States
TELEPHONE: (612) 378-9449

RECORD TYPE: Directory

CONTACT: Sales Department

Stat-Ease offers Design-Ease (R) 6, which helps researchers set up and analyze two-level factorial, Taguchi orthogonal arrays, fractional factorial, Plackett-Burman, and other experimental designs. These designs can quickly identify critical **variables** and directions for improvement. They are particularly well-suited for the early stages of product or process **optimization**. Design-Ease provides information on the resolution and alias structure to guide users to a good design. It can add center points to the factorial designs. Experiments can run in blocks or completely randomly. It is easy to learn and fast. Experimental designs are selected from easy-to-understand menus. To aid users in their choice, the alias structure for each fractional factorial design is given. Designs can be run completely randomized or in blocks. Interaction plots help users interpret significant two-factor interactions. Design-Ease can tap into two-level designs that extend to 256 runs; avoid the risk of wrong answers due to confounding; copy **statistical** outputs to a word processor and show these to customers or managers; protect users from lurking **variables**; calculate response data using familiar spreadsheets, then paste it to Design-Ease; and find an optional design showing all the details about resolution and aliasing. Design-Ease can also test for curvature using factorial design center points, helping **minimize** total experimentation and production costs; use residual plot analysis validation; produce analysis or variance (ANOVA); and handle botched or missing data.
DESCRIPTORS: CAE; Engineering; Graphics for Science & Engineering; Industrial Engineering; Research & Development; Science; **Statistics**
HARDWARE: 80486; IBM PC & Compatibles; Pentium
OPERATING SYSTEM: Windows; Windows NT/2000; Windows XP
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Micro
POTENTIAL USERS: Industrial Scientists, Industrial Engineers, Industrial Researchers
DATE OF RELEASE: 06/1997
PRICE: $395; net 30; 30-day money-back guarantee
DOCUMENTATION AVAILABLE: User manuals; reference manuals
TRAINING AVAILABLE: Training; technical support
OTHER REQUIREMENTS: 16MB--Win 95, 32MB+ RAM required
SERVICES AVAILABLE: Consulting; warranty
REVISION DATE: 20030228

9/9/4

DIALOG(R)File 256:TecInfoSource

01708321 DOCUMENT TYPE: Product

PRODUCT NAME: XCALIBRE (708321)

Assessment Systems Corp (616826)
2233 University Ave #200
St Paul, MN 55114-1629 United States
TELEPHONE: (612) 647-9220

RECORD TYPE: Directory

CONTACT: Sales Department

XCALIBRE from Assessment Systems uses marginal **maximum**-likelihood methods for estimating item **parameters** for both the two-parameter and three-parameter item response theory (IRT) models. Because it is based upon marginal **maximum**-likelihood methods, it can estimate item **parameters** for datasets with fewer items and/or fewer examinees than conventional **maximum**-likelihood approaches. XCALIBRE implements Bayesian prior distributions on the individual item **parameters**, and these prior distributions can be updated during estimation. Researchers can fix selected item **parameters** to known (prespecified) values and automatically calibrate the remaining item **parameters** to **fit** that scale, thus making item pool linking/equating much simpler. XCALIBRE can differentiate between not answered and skipped items.

DESCRIPTORS: Colleges & Universities; Social Science; Software Testing; **Statistics**; Survey Research

HARDWARE: IBM PC & Compatibles
OPERATING SYSTEM: Windows; Windows NT/2000; Windows XP
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Micro
POTENTIAL USERS: Researchers, Science
PRICE: $399; $950--complete test analysis package; Internet demo available

DOCUMENTATION AVAILABLE: Online documentation
REVISION DATE: 20030518

9/9/6

DIALOG(R)File 256:TecInfoSource

01708275 DOCUMENT TYPE: Product

PRODUCT NAME: MULTILOG 7 (708275)

Scientific Software International Inc (465534)
7383 N Lincoln Ave #100
Lincolnwood, IL 60646-1704 United States
TELEPHONE: (847) 675-0720

RECORD TYPE: Directory

CONTACT: Sales Department

MULTILOG 7 from Scientific Software International employs item-response theory to perform analyses and test scoring for multiple-category items. It provides item parameter estimation and subject scoring under the Samejima logistic model for graded responses, the Bock multinomial logit model for multiple nominal categories, the Bock-Samejima-Thissen model for multiple choice items with guessing, and Masters' partial-credit model. These models can be **fit** to a latent ability continuum by marginal **maximum** likelihood or to a manifest ability criterion by **maximum** likelihood. MULTILOG has the capacity to impose equality constraints on selected subsets of item **parameters**, making it possible to analyze models intermediate between conventional 1-, 2-, and 3-parameter logistic models. MULTILOG also permits (quasi-)continuous measured **variables** to be mixed with the multiple category responses.

DESCRIPTORS: Colleges & Universities; Schools; Social Science; **Statistics**; Survey Research; Test Scoring

HARDWARE: IBM PC & Compatibles
OPERATING SYSTEM: Windows; Windows NT/2000
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Micro
POTENTIAL USERS: Researchers
PRICE: Available upon request; educational discounts available

DOCUMENTATION AVAILABLE: Online documentation
TRAINING AVAILABLE: Technical support
REVISION DATE: 20030228

9/9/7

DIALOG(R)File 256:TecInfoSource

01708232 DOCUMENT TYPE: Product

PRODUCT NAME: HLM 5 (708232)

Scientific Software International Inc (465534)
7383 N Lincoln Ave #100
Lincolnwood, IL 60646-1704 United States
TELEPHONE: (847) 675-0720

RECORD TYPE: Directory

CONTACT: Sales Department

HLM 5 from Scientific Software International supports hierarchical linear modeling (HLM) and nonlinear modeling. As users specify **variables** at each level, the software constructs relevant equations for each level in a graphics box. These are saved and can be easily modified for subsequent analysis. HLM can read data from a variety of **statistical** packages including SPSS, SAS, SYSTAT, and STATA. It produces residual files that can immediately be read into these packages. Thus, all of the familiar exploratory analysis methods, data transformations, and graphical capabilities of these packages are readily available. HLM allows estimation of Bernoulli and binomial models for binary data with a logit link function and Poisson models for count data with constant or variable exposure with the log link function. Estimation is available for two- and three-level models with and without over-dispersion. Users can analyze data at the person level or grouped by covariate set. HLM provides estimation of population-average models using generalized estimating equations with and without robust standard errors as described by Zeger, Liang, and Albert (1988). HLM combines EM and Fisher scoring algorithms to produce a high standard of speed and reliable convergence for both two-level and three-level programs. Full **maximum** likelihood for two- and three-level hierarchical linear models and full penalized quasi-likelihood estimates for hierarchical generalized linear models are accompanied by standard errors for variance-covariance components. Replicated analyses for multiply imputed datasets such as the National Assessment of Educational Progress, the National Adult Literacy Survey, and the International Adult Literacy Survey are available for the two-level model. Newer features include unrestricted models, multinomial regression for two-level data, latent variable analysis, and ordinary least squares vs. estimates comparisons.

DESCRIPTORS: Colleges & Universities; Models; Regression Analysis; Research & Development; Science; Social Science; **Statistics**

HARDWARE: IBM PC & Compatibles
OPERATING SYSTEM: Windows; Windows NT/2000
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Micro
POTENTIAL USERS: Researchers, Science
PRICE: $430; upgrade pricing; user manual--$35; educational discounts available; student version--$0

DOCUMENTATION AVAILABLE: User manuals
TRAINING AVAILABLE: Technical support
OTHER REQUIREMENTS: Win 9x+ required
REVISION DATE: 20030228

9/9/8

DIALOG(R)File 256:TecInfoSource

01696412 DOCUMENT TYPE: Product

PRODUCT NAME: MultiSimplex 2.0 (696412)

Statistical Designs (539058
9941 Rowlett #6
Houston, TX 77075 United States
TELEPHONE: (713) 947-1551

RECORD TYPE: Directory

CONTACT: Sales Department

MultiSimplex 2.0 rapidly **optimizes** technical systems and processes using the basic or modified sequential simplex **optimization** methods. It can simultaneously adjust 15 continuous control **variables**. Fifteen different responses can be specified and combined using functions determined by fuzzy theory. **Maximum, minimum** or target values can be specified for each response. Results and graphical summaries are available throughout the process using the graphing capabilities of Excel. The program allows users to define experiment points at any time, thus taking into account existing experimental information.

DESCRIPTORS: CAE; Chemistry; Fuzzy Logic; Goal Seeking; Industrial Engineering; Process Control; Research & Development; Science

HARDWARE: 80486; IBM PC & Compatibles; Pentium
OPERATING SYSTEM: Windows; Windows NT/2000; Windows XP
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Micro
POTENTIAL USERS: Science, Engineering, Research & Development
DATE OF RELEASE: 01/1997
PRICE: $1,299; $399--academic; volume discounts available

DOCUMENTATION AVAILABLE: User manuals; tutorials
TRAINING AVAILABLE: Training; telephone support; technical support; e-mail support
OTHER REQUIREMENTS: 8MB RAM; 80486+ CPU; Win 9x or NT 4.0 required
REVISION DATE: 20010530

9/9/9

DIALOG(R)File 256:TecInfoSource

01682632 DOCUMENT TYPE: Product

PRODUCT NAME: Amos 4.0 (682632)

SmallWaters Corp (639206)
1507 E 53rd St #452
Chicago, IL 60615 United States
TELEPHONE: (773) 667-8635

RECORD TYPE: Directory

CONTACT: Sales Department

Amos 4.0 from SmallWaters allows easy structural equation modeling and confirmatory factor analysis. Features include fully interactive, graphical path modeling that delivers presentation quality path diagrams for reports and publications; analysis of mean structures displayed in the path diagram; multi-group analysis, including different models for different groups; and missing data analysis by full information **maximum** likelihood for efficient parameter estimates. Amos 4.0 users can set equality constraints by using the same name for two or more **parameters** or value constraints by entering a number. Estimation methods include ML, ULS, GLS, ADF, and scale-free LS; **fit statistics** include chi-square, AIC, FO, RMSEA, ECVI, and many others; bias estimates and empirical confidence estimates tap bootstrap simulation for any empirical data distribution. Amos also offers Bollen-Stine corrected bootstrap for model testing under nonnormality. With Amos, multiple models are analyzed simultaneously (determines which models are nested and calculates the test **statistics** between them). Amos's newer features include direct, indirect, and total effects; p-values for individual **parameters**; a drag-and-drop interface; and broad Excel integration. Amos supports all European languages and Japanese, and it supports files in popular office and **statistical** applications.

DESCRIPTORS: Colleges & Universities; Foreign Language Packages; Models; Research & Development; Science; **Statistics**

HARDWARE: IBM PC & Compatibles; Pentium
OPERATING SYSTEM: Excel; Windows; Windows NT/2000
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Micro
POTENTIAL USERS: Researchers, Science
PRICE: Available upon request; free student version available on Web; approximately 688 Euros; upgrade pricing

DOCUMENTATION AVAILABLE: User manuals; online documentation
OTHER REQUIREMENTS: 16MB RAM required; 64MB RAM recommended
REVISION DATE: 20030320

9/9/10

DIALOG(R)File 256:TecInfoSource

01640182 DOCUMENT TYPE: Product

PRODUCT NAME: Experimental Data Analyst (640182)

Wolfram Research Inc (443352)
100 Trade Center Dr
Champaign, IL 61820-7237 United States
TELEPHONE: (217) 398-0700

RECORD TYPE: Directory

CONTACT: Sales Department

Wolfram Research's Experimental Data Analyst provides a set of detailed programs and packages for the **fitting**, visualization, and error analysis of experimental data. Extensive error analysis capabilities handle errors in both coordinates of the data, obtain estimated errors in the **fit parameters**, and examine graphical information about the **fit** including residuals of the **fit**. Data can be **fit** to linear or arbitrary models. Users can **fit** data to lines or curves when one or more of the data points can be wild and the least-squares technique cannot be used. For advanced problems, researchers can customize the behavior of the **fitting** routines by selecting from numerous options. Or, for less complex cases, EDA users can simply rely on the defaults for quick, accurate solutions. A variety of data transformation techniques, such as data smoothing and noise elimination, are available, as well as routines that automatically propagate errors of precision. Experimental Data Analyst's graphics capabilities provide a rich environment for visualizing experimental data. An extension of Mathematica's ListPlot function visualizes errors in data coordinates with error bars. The distribution of data values can be viewed pictorially using histograms or box plots. Users can fully control the display based on the data, the number of bins, and the **minimum** and the **maximum**.

DESCRIPTORS: Engineering; Research & Development; Science;
    Statistics

HARDWARE: Alpha; Apple Macintosh; HP; HP 9000; IBM PC & Compatibles; IBM
    RS/6000; Silicon Graphics; Sun; UNIX
OPERATING SYSTEM: AIX; DOS; HP-UX; IRIX; Linux; MacOS; NextStep; OS/2;
    Solaris; SunOS; UNIX; VMS; Windows; Windows NT/2000
PROGRAM LANGUAGES: Not Available
TYPE OF PRODUCT: Mini; Micro; Workstation
POTENTIAL USERS: Engineers, Financial and Data Analysts, Physical
    Scientists
PRICE: $495; educational discounts available

TRAINING AVAILABLE: Technical support; support contracts
REVISION DATE: 20030414

9/9/31
DIALOG(R)File 256:TecInfoSource

00142118 DOCUMENT TYPE: Review

PRODUCT NAMES: iSIGHT Six Sigma (653063); ANSYS DesignXplorer (135631); Linux (833916)

TITLE: The **Probability** of **Optimum** Design
AUTHOR: Elliott, Louise
SOURCE: Desktop Engineering Magazine, v8 n2 p20(4) Oct 2002
ISSN: 1085-0422
HOMEPAGE: http://www.deskeng.com

RECORD TYPE: Review
REVIEW TYPE: Product Analysis
GRADE: Product Analysis, No Rating

Linux, Engineous Software's iSight Six Sigma, and ANSYS's Ansys DesignXplorer are products with probabilistic methodology abilities that can predict when objects will break. With probabilistic methodology, a **statistical** approach is taken to random **variables** and determining **probabilities**. In engineering, design **variables** such as geometries, temperature, and material properties are extended to show a more precise and in-depth view of the performance of a design and its reaction to an environment. The iSight Six Sigma engine is used mostly for automotive applications and uses finite element analysis (FEA) tools to **optimize** designs. MSC.Software has created easy to use engineering applications for probabilistic methods. Veros Software provides several probabilistic engines that can be used with FEA programs. Eric Fox, VP of technology for Veros, says probabilistic studies consider many load combination possibilities and assists in choosing those that are most typical. Results show the **probability** that the load will be exceeded and what events will most influence breakage. Probabilistic methods can both save money and improve the quality of designs. For purposes of prediction, probabilistic methodology uses a physics, behavioral, rule, process- based predictive model, and considers various uncertainties and the possibility of error. It also uses past performance data to improve accuracy, but does not require past performance data to build a predictive model.

COMPANY NAME: Engineous Software Inc (628077); ANSYS Inc (060607); Vendor Independent (999999)
SPECIAL FEATURE: Screen Layouts Tables
DESCRIPTORS: Auto Manufacturing; CAE; Engineering; FEA (Finite Element Analysis); Linux; Maintenance Management; Quality Assurance
REVISION DATE: 20031030

9/9/33

DIALOG(R)File 256:TecInfoSource

00132597 DOCUMENT TYPE: Review

PRODUCT NAMES: MapCalc Learner (059862)

TITLE: MapCalc Learner
AUTHOR: Limp, W Fredrick
SOURCE: GeoWorld, v14 n6 p58(2) Jun 2001
ISSN: 0897-5507
HOMEPAGE: http://www.geoplace.com/gw/

RECORD TYPE: Review
REVIEW TYPE: Review
GRADE: A

Red Hen Systems' MapCalc Learner, an excellent revolutionary raster software package, is available with single user or academic lab licenses. It offers superb documentation and many Berry-written case studies, examples, graphics, and workflows. With MapCalc Learner, users can perform all types of features on their wish lists. MapCalc Learner has a top-notch selection of standard raster operators and also includes advanced and robust operations. For instance, Clump identifies contiguous areas, while Configure permits many shape and structural analyses. Size computes areas for each analysis, and Span computes the **minimum** width of each contiguous area from edge to edge. Spread is a module that creates traditional buffers but also permits spreading over an elevation data surface or through a friction surface. Composite permits users to compute **parameters** from one map in the categories of another map. Analyze can compute many **statistics** for each cell over multiple maps. Other functions described include Crosstab, Intersect, Drain, Stream, and Radiate. Cluster can do a classification process, while Correlate creates a correlation matrix for multiple maps. Compare creates a table of **statistical** values that compare two maps, and Regress does a linear regression on values in each cell in multiple separate map; Regress then outputs a map with an estimated value for the dependent map's cell.

PRICE: $22

COMPANY NAME: Red Hen Systems Inc (666491)
SPECIAL FEATURE: Screen Layouts
DESCRIPTORS: Graphics Tools; Image Processing; Mapping
REVISION DATE: 20011030

DIALOG(R)File 275:Gale Group Computer DB(TM)

01205837 SUPPLIER NUMBER: 04655435 (THIS IS THE FULL TEXT)
Desktop data acquisition. (Software Review) (ASYSTANT+ data acquisition and analysis software package from Macmillan Software)
Wright, Victor E.
PC Tech Journal, v5, n2, p106(13)
Feb, 1987
DOCUMENT TYPE: evaluation ISSN: 0738-0194 LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 8213 LINE COUNT: 00652

ABSTRACT: The ASYSTANT+ data acquisition and analysis software package from Macmillan Software is an add-on package for the company's ASYSTANT program, which converts IBM PCs and compatibles into sophisticated desktop calculators. The $895 ASYSTANT+ adds the ability to control data acquisition accessories, using a user interface similar to stack-oriented hand-held electronically-programmable calculators such as those offered by Hewlett-Packard. While the package cannot offer the performance of dedicated instruments, it does provide such scientific and engineering data acquisition and analysis functions such as waveform generation and processing, three-dimensional graphics, data file operations, curve **fitting**, polynomials, **statistics**, differential equations, a notepad, and a DOS command menu along with its calculator operations. The system requires 640Kbytes of RAM, an 8087or 80287 math coprocessor, two diskette drives or one diskette drive and a hard disk drive, and a graphics board.

TEXT:

In the scientific laboratory, data acquisition and analysis programs are playing an increasingly important part in the manipulation of experimental data. Similarly, such programs can be used in a variety of industrial applications of control simply processes.

Macmillan Software's ASYSTANT+ converts the IBM PC and compatibles into a desktop data acquisition and analysis system comprising several virtual instruments. For many applications that can tolerate moderate sampling rates, ASYSTANT+ can take the place of more expensive, dedicated instruments--albeit at a loss in ultimate performance.

The basic version of the program, ASYSTANT, converts the PC into a sophisticated calculator. To that basic capability, the more advanced version, ASYSTANT+, adds the ability to control a data acquisition accessory. ASYSTANT+'S capabilities are similar to those of a sister product, ASYST, which provides a FOURTH interpreter-like user interface.

A SOPHISTICATED CALCULATOR

ASYSTANT+'S basic user interface is similar to that of a stack-oriented, hand-held, electronic programmable calculator, such as the various Hewlett-Packard (HP) models. In fact, the main screen display is referred to as the desktop calculator and resembles a calculator in functionality. It is divided into five **windows**, four of which correspond to the facilities of an advanced programmable calculator (see photo 1). The fifth window contains the main options that access other parts of the program, such as waveform processing and generating, graphics, and curve **fitting**.

The calculator **windows** are stack contents, calculator

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functions, **parameters**, and **variables**. Three other calculator menus--array operations, conversions and special functions, and wave matrix operations--can be interchanged with the calculator functions (see figure 1). Each calculator menu includes the selection, next, to display the next calculator menu.

A key concept in learning to use ASYSTANT+ is that of the stack--an area of memory used for temporary data storage. Data can be placed on the stack from the keyboard or from other storage areas, and can be removed from the stack to be placed in other storage areas. Most operations and functions take their arguments from the stack and leave their results on the stack. HP calculator users and FOURTH programmers should be comfortable with the system.

The program begins with a cursor positioned on the first selection of the main menu, acquire. Pressing PgUp moves the cursor to the calculator functions menu. This gives the expected assortment of mathematical functions and stack operators--store, stores the entry at the top of the stack in a parameter or variable; dup, duplicates the top entry in the stack; drop, drops the entry at the top of the stack; swap, switches the top two entries on the stack; and roll, places the bottom entry on the stack on the top and pushes the other entries down one.. A status selection allows the user to select the format of numeric output: angular units for use with trigonometric functions, and data type--integer, double-precision integer, real, double-precision complex.

Calculator commands can be entered by moving the cursor to the desired selection with the arrow keys and pressing Enter or by typing them at the keyboard. When a number, letter, or operator is typed, the main menu window clears and a command line area appears in its place, regardless of the location of the cursor.

Commands can be entered in Reverse Polish Notation (RPN) used by HP and FORTH or in algebraic notation. The program expects RPN; an algebraic notation always mus t be preceded with the character. Commands can be entered in strings and then are terminated with the Enter key. Entering a valid number places a result on the stack. ASYSTANT+'S stack is limited to five entries, which are displayed in the stack contents window. Stack entries can be integers, real numbers, complex numbers, or arrays of integers, real numbers, or complex numbers.

In the calculator menu, macros ("user functions") can be assigned to the ten function keys. Each key can be assigned up to five lines of RPN or algebraic notation. Pressing a function key while in the Calculator executes re macro. The macro assigned to one key can include the name of another key, so that additional functions may be performed by a single macro.

The **parameters** and **variables windows** on the main screen display provide two types of storage registers, nine of each, **Parameters**, A through I, store numbers; and **variables**, R through Z, store either numbers or arrays. Parameter and variable values can be copied to the stack, and stack entries can be copied or, moved to the parameter and variable registers. **Parameters** and **variables** are available in all parts of the program, and they can be assigned descriptive names.

VECTORS AND MATRICES

The array operations menu is displayed by selecting the next option from the calculator functions menu. It offers a set of commands to create and manipulate arrays. ASYSTANT+ provides for two types of arrays; one-dimensional arrays, or vectors, and two-dimensional arrays, or matrices, An array occupies one slot on the stack or one variable. Arrays

cannot be stored in **parameters**.

The program uses two 64KB segments of RAM for storage of arrays. One segment contains the arrays assigned to the **variables** R through Z, and the other segment contains any unnamed arrays on the stack. A single array can occupy an entire 64KB segment.

The array operations menu offers selections for the basic vector and matrix operations. Three commands, n:ramp, nm:ramp, and aedit, generate unnamed arrays and place them on the stack. N:ramp takes the top entry on the stack as the size of a one-dimensional array (vector) and replaces it with a vector in which the i.sup.th element contains the value i.sup.th the value of each element is equal to the index. Nm:ramp takes the top two entries as the number of rows and columns of a two-dimensional array and replaces them with an array in which the ij.sup.th element contains the value (i-1)m+j-i is the row index and j is the column index.

The commands xsect, sub, trans, drag, and reverse access certain array elements. Xsect takes the top element of the stack and replaces it with an element, sub with a subarray, trans with the transpose of the array, diag with the main diagonal, and reverse replaces the top element of the stack with an array with reversed column indices.

Arrays can be reordered with the commands n:rot, reshape, sort, and lookup, and they can be indexed with index and n:search. Two commands combine two arrays to form a third; cat stacks the two arrays one over the other, and lam places them side by side. Cumulative operations can be performed on the rows of an array to calculate sums and products and find cumulative **maxima** and **minima**.

Arrays can be examined in spreadsheet forms with the array editor function, aedit. Arrays can be created directly with aedit or with another command, n:ramp, nm:ramp, lam, or cat, for example, and then edited. They also can be built and edited by using other menu options and functions, but using the array editor is the easiest way to make minor changes.

Switching to the third calcubtor menu, conversions and special **functions**, provides an assortment of options for **converting** data from one coordinate system to another, or from one data type to another, as well as special advanced **functions**. Numbers can be **converted** from a pair of values on the stack, one real and one imaginary, into a single complex entry on the stack A single complex entry can then be split into a pair of values.

Data sets representing coordinates can be converted between Cartesian coordinates and polar coordinates or spherical coordinates. Also, complex numbers in the form x + jy can be converted to the polar form. (Note that PC Tech Journal is using the electrical engineering notation j for the imaginary part of the complex number rather than the mathematical form i.)

The more advanced functions include the error function, factorials, the number of combinations of things taken r at a time from a set of n things, the number of permutations of things taken r at a time from a set of n things, the Bessel functions, elliptic integrals, the gamma function, and the incomplete beta function.

The wave and matrix menu, the fourth calculator menu, offers several numerical techniques for the analysis of waveforms and matrices. Storing waveforms as arrays allows the use of many operations for the analysis of waveforms or matrices. A series of waveforms can be stored in a two-dimensional array, one waveform per row.

Once the waveforms have been stored, two functions, smooth and window, are available to filter them. The smooth function, a low-pass filter, removes high-frequency components of a waveform in the time domain, to eliminate noise in a signal, for example. The window function simulates

a Blackman window, filtering out selected high and low frequencies. This function is better suited to waveforms stored in the frequency domain.

A waveform can be intergrated by using Simpson's 1/3 rule or differentiated by using interpolating polynomials of a user-specified degree, as many as seven. Four functions are provided for Fourier transformations: fast Fourier transforms and inverse fast Fourier transforms for both one- and two-dimensional arrays. An additional function calculates the power spectrum (the square of tile magnitude of the Fourier transform) of an array.

Other matrix operations included in the fourth calculator menu are the autocorrelation function, which is applied to the top entry on the stack; the aperiodic convolution of the top two entries; the application of a Blackman window to a subset of the top entry; the Hilbert transform of the top entry; and the cross correlation of the top two entries. By combining these advanced functions, the user can firer signals with low-pass or band-pass firers to remove noise or isolate signal components, process images, generate spectral analysis displays, generate diffraction patterns, and analyze signals in both the time and frequency domains.

The program performs the basic **statistical** operations, average, standard deviation, **maximum**, and **minimum**. A single operator is provided to solve the matrix equation, y = Ax. The operator expects they vector as the top stack entry, and the A matrix (n by n) as the second entry. It replaces these two entries with the x, or solution, vector. Additional matrix functions are available, they include commands to return the trace of a matrix (the sum of the diagonal elements), the matrix product of two arrays, the Kronecker product of two arrays, the determinant of a matrix, and the inverse of a matrix.

CHOOSING FROM THE MENU

The main menu of ASYSTANT+ provides 11 options that enhance the versatility of the program. These options include, graphics, a waveform generator and processor, two file operations, users **functions**, **curve fitting**, polynomials, **statistics**, differential equations, and a data acquisition menu.

Graphics. ASYSTANT+'s graphics commands allow data to be displayed on the screen, on a graphics printer, or on a pen plotter. Graphics boards, printers, and plotters are selected from menus at the beginning of the initial session, and the selection can be changed a the beginning of any session thereafter.

Arrays are used to store graphics data. Two types of graphic displays can be generated, Cartesian plots and three-dimensional plots. Cartesian plots include line graphs of a single vector variable or a row of a rectangular array, plotted as a function of the indices; and line graphs of two vector **variables** or rows of rectangular arrays, with one variable or row taken as the independent variable and the other as the dependent variable.

Three-dimensional representations include axonometric plots and contour plots of two-dimensional arrays (shown in photo 2). An axonometric plot displays a surface representing the values of the plotted array superimposed over a rectangular grid; the height of the surface above the grid is proportional to the value of the array element. A contour plot displays a series of contour lines superimposed over a grid with the contour lines connecting elements of equal magnitude.

The graphicsdisplay is available to preview graphics before plotting. The default screen display includes a graphics menu and a graphics window. The graphics window can be split into and right halves, upper and halves, and four quarters.

ASYSTANT+ is able to produce a plot with a **minimum** of information, by using default values and scaling the axes to display all of the data in a single plot. The Setup command gives the user the ability to customize the plot by specifying **minimum** and **maximum values**, linear or logarithmic scales, labels, grids, and the location of the origin. Whenever an IBM Enhanced Graphics Adapter (EGA) is used, the axes, labels, background, and plot can be displayed in different colors.

Users also can customize graphics **windows** with the addition of text labels. Labels can be positioned and aligned as desired. The contents of a graphics window can be saved to disk, and recalled at a later time for display.

A graphics display is generated by selecting the type of plot--y Auto, y Plot, xy Auto, xy Plot, xy Axis, Axon, or contour. The program prompts for the variable to be plotted and then displays a menu that includes the selections display graph and to plotter; these selections produce screen displays and plots.

Waveforms. ASYSTANT+ includes both a waveform generator and processor. The generator creates arrays of values that represent a variety of continuous waveforms typically available from analog function generators. These include sine waves, cosine waves, square waves, triangular waves, sawtooth waves, pulses, uniform noise, white noise, and Poisson pulse trains. In addition to selecting the type of waveform, the user can control the gain, bias, and frequency of the waveform. These created arrays can be displayed on the screen, stored on disk, plotted on the pen plotter, and used as the digital input to an digital-to-analog convertor in ASYSTANT+.

The waveform generator produces a single output-one of the waveforms listed above. However, the output can be stored in memory and then pushed onto the stack. Successive output waveforms can be pushed onto the stack, and then the calculator can be used to manipulate or combine them, creating waveforms of arbitrary complexity.

While in the waveform generator, two waveforms are immediately available: the output of the generator and a waveform stored in memory. The output waveform can be added to the memory waveform to create complex waveforms without leaving the generator. Waveforms can be plotted on either the screen or the plotter.

The waveform processor provides a graphic alternative to the calculator for processing one-dimensional arrays (waveforms) or specified rows of two-dimensional arrays. The waveform processor display includes a large window in which a waveform is displayed, a series of small **windows** that summarize the history of the wave processing session, and a menu of commands.

The commands available in the waveform processor are a subset of those available in the calculator and file processor. However, intermediate results are displayed on the screen interactively, and several graphic aspects of display can be specified by the user.

Waveforms can be processed in segments, allowing uninteresting portions of the waveform to be ignored, or separate segments to be processed in different ways. A current segment can be selected graphically, by positioning two cursors in the main graphic window. Segments of the waveform are stored in several repositories-WFM (waveform), ORG (original segment), MEM (memory segment), PRV (previous segment), and SEG (current segment). Images of the repositories are shown a the top of the screen for reference; contents of MEM and SEG can be combined with selections from the waveform processor's memory ops menu.

Processing options include scaling the waveform with a fifth-degree

polynomial, clipping SEG to a specified **minimum** and **maximum**, computing the derivative of the waveform (to a user-specified order), computing the integral, smoothing the current segment, computing the power spectrum, and finding the envelope of the waveform. An analysis menu provides selections to find the basic **statistics**, rise time, fall time, area under the curve, and width of a specified peak.

Data file operations. Two submenus from the main menu are devoted to file operations: file I/O, and file processor. File I/O provides the basic facilities for storing and retrieving data associated with **variables** and for converting data files into files that can be used by other programs. The program supports two external formats: DIF and ASCII,

ASYSTANT+ data files are physically composed of a block of comments followed by a series of data subfiles. Logically, the file can consist of comments and data sets.

Both subfiles and data sets contain multiple data points, and both are limited to 64KB, which corresponds to the area in RAM that ASYSTANT+ sets aside for the storage of **variables**. A data file can contain several blocks that may represent various aspects of a model or experiment.

ASYSTANT+'s file I/O menu allows subfiles and data sets to be selected as rectangular sections of a group of arrays. Even though the data file is actually a linear sequence of values, data can be addressed by row and column number, just as if the data were arranged in two dimensions, Data sets can be selected by specifying values or by scrolling through the file graphically.

The file processor menu integrates calculator functions and disk I/O functions. The processing capabilities of the desktop calculator and the file processor are identical. However, the file processor allows the user to specify the data source, the operations to be performed, and the destination for the results. The actual processing can be allowed to proceed unattended, whereas processing with the desktop calculator usually must be performed step by step.

Curve **fitting**. The curve **fitting** of ASYSTANT+ gives an interactive environment for fining smooth curves through x-y data sets. Results are displayed as mathematical values and in graphic form.

The **fitted** curve can be specified as linear, polynomial, logarithmic, exponential, multilinear, or user-defined. Multilinear **fits** operate on one rectangular array and one vector, and the remaining **fits** operate on two vectors. The goodness Of **fit** is determined by the least-squares fining method.

Both the original data and the **fitted** curve are displayed, superimposed in a graphic window. The residual error curve is plotted in a separate window.

Polynomials. An extensive set of polynomial operations can be performed from the polys menu. Polynomials can be added, subtracted, multiplied, divided, and shifted by a factor. Polynomial coefficients can be edited and copied to a variable. Roots can be extracted and saved in a variable, and polynomials can be integrated and differentiated. Finally, selections are provided to generate Legendre, Laguerre, Tchebyshev, and Hermite polynomials.

ASYSTANT+ can handle 10 polynomials. Each polynomial can contain real or complex coefficients and can be up to the ninth degree. A polynomial is first defined, and then it can be applied to the top stack entry.

Statistics. The stats selection of the main menu presents a submenu of **statistical** operations and messages. An edit function is available to allow the user to create or edit a data table without leaving the menu. The stats editor is identical to the array editor that is

provided in the desk calculator.

. The basic stats option computes and displays the basic **statistics** for a variable or subset of a variable. The **statistics** displayed include the **maximum value**, the **minimum** value, the sum of the values, the mean, the median, the variance, the standard deviation, skewness, kurtosis, the sum of the squares, and the root mean square. These values are displayed in a window on the screen and can be sent to the printer. Other basic **statistical** functions such as sorting, percentile calculations, and hypothesis testing also can be performed from the menu. The hypothesis tests that are provided include the Kolmogorov-Smirnov normality test, the 1 sample to test, the 2 sample to test, the 1 sample chi-square test, the 2 sample F test, the Wilcoxon signed-rank test, and the Mann-Whitney rank-sum test.

Histograms can be generated and plotted. The user specifies the number of breakpoints between "bins". The program sets up the specified number of bins, equally spaced between the **minimum** and **maximum** data values. Once generated, the histogram can be plotted, saved to a disk file, or left in the calculator **variables**.

A menu selection is available to generate commonly used frequency distributions. These include both percentages and percentiles of the normal distribution, the chi-squared distribution, the student to distribution, and the F(n,m) distribution.

Two advanced analysis techniques are provided by ASYSTANT+, Stepwise regression is included with three variations of the analysis of variance (ANOVA) technique, one-way, two-way, and table. The ANOVA techniques indicate which of several independent **variables** are most significant in explaining the variations in the dependent variable. ASYSTANT+ displays the results of ANOVA in a table listing the sum of the squares, the degrees of freedom, the mean sum of the squares, the F-value, and the significance level of the F-value for each component and the residuals.

The regression option allows the construction of a model representing a dependent variable as a linear function of several independent **variables**. A vector holds the dependent variable, and an array holds the independent **variables**. The technique is interactive.

Terms can be entered into and removed from the model with a few keystrokes; this allows several combinations of terms to be examined easily.

Differential equations. ASYSTANT+ provides a numerical method for solving first-order differential equations, ranging from a single equation to a system of five equations, using the fourth order Runge-Kutta method. Up to six **variables** are used, the X variable for the independent variable, and Y, Z, U, V, and W for dependent **variables**.

The model to be examined is specified by entering the system of differential equations, the initial conditions, and extrapolation **parameters**, consisting of step size used to generate the solution curves and the final X-value. Solution curves are stored in **variables** that can be displayed on the screen under the graphics menu, saved to disk, or sent directly to the plotter.

Notepad. ASYSTANT+ includes a simple screen editor, the notepad, which is available from both text and graphics screens by pressing Ctrl-N. The manual cautions that the notepad is not intended to take the place of a word processor; however, the editor is equal to the task of taking notes during experiments and creating simple reports.

The notepad is limited to straight ASCII text files with no control characters (such as the ones inserted by most word processors), 16KB total file size, and 80-character lines. Arrow keys and function keys are

implemented, to provide cursor movement by character, word, line, word, and file. A limited set of block operations is available, as well as search and replace capability.

Text can be inserted into the current notepad file when the editor itself is inactive, ASYSTANT+ stores re current file name, and a cursor location. The calculator functions menu includes a print command that sends the top stack entry to the screen, printer, or current notepad disk file. Disk file output can be inserted a the current cursor location or appended to the end of the file. Charts and tables can be constructed in the stack with the various matrix operators and functions, edited with the aedit command, and then inserted into the notepad file.

Mini-calculator. A streamlined version of the desk calculator, the mini-calculator, is available from both text and graphics displays when any of the main menu options is active. Only the command line can be used for input; menu input is not available, and those commands that are only available as menu selections cannot be called from the mini-calculator. The display consists of the stack and a command line.

DOS commands and help. A menu of basic DOS operations can be invoked by pressing Ctrl-D. Menu selections can delete, copy, and rename files, display directories, and return to ASYSTANT+. An on-line help facility can be invoked by pressing the ? key. It is context sensitive and organized to follow the structure of the manual. The help display can be paged by pressing the Space Bar, or navigated with the function keys.

ACQUIRING THE DATA

In addition to the basic ASYSTANT facilities, ASYSTANT+ includes the software necessary to control data acquisition hardware, The host computer, under the control of ASYSTANT+, becomes the control panel and graphic display for several such devices. In each case, the computer display resembles a traditional analog instrument.

Data acquisition functions are available from the data acquisition menu, which is displayed when the acquire option is selected from the main menu. This menu includes selections for the various instruments ASYSTANT+ can emulate and a selection for configuring the software to match the data acquisition board or external chassis.

Configuration of the system is menu-driven. It consists of selecting the host computer and the data acquisition board from lists of supported devices and then setting various **parameters** to match the physical configuration of 'the data acquisition board. The manual astutely warns the user that determining the physical configuration of the hardware may not be a trivial matter. A detailed appendix provides information about the configuration of supported boards; it is presented clearly and concisely enough to replace most data acquisition board manuals for standard applications.

It should be noted that configuration involves specifying the host computer as well as the data acquisition board, even though the program is in use on the host computer. The program must know the clock speed of the host computer to perform timing tasks.

Data acquisition board **parameters** that are specified during the configuration process include the board's I/O address, the number of A/D channels, the A/D channel voltage range, the hardware gain, the number of D/A channels, and the D/A voltage range. ASYSTANT+ does not necessarily support all of the features and configurations of supported boards, but the manual documents the ones that are.

Additional configuration **parameters**, selected from the acquisition configuration menu include confirmation that a hardware scroller board (a high-speed, strip-chart recorder) is installed, the

specification of engineering units to be used in file conversion, color assignments for A/D channels when an EGA board is installed, the assignment of names to channels, and a bit pattern to be set on the digital output port at the beginning of a data acquisition session. A final option is the selection of an unprotected mode. ASYSTANT+ normally operates in a protected mode, in which it prevents acquisition of data a sampling rates above that known to be reliable (the Nyquist rate). The unprotected mode allows the user to specify higher sampling rates a the risk of hanging the system, requiring a reboot.

With the data acquisition board installed and configured, ASYSTANT+ provides the user with the ability to select the preferred interface, or metaphor, from the data acquisition menu. Each selection performs the same basic task, that of controlling the data acquisition board, but it resembles a different laboratory instrument (see figure 2).

ASYSTANT+ can simulate a strip-chart recorder, a hardware scroller (if one is installed), an XY recorder, a transient recorder, a data logger, a high-speed recorder; a signal generator, and a function generator. When an instrument is selected, the program displays a submenu including options to set or modify instrument **parameters**, to begin acquiring data, and to return to the data acquisition menu. Set-up **parameters** can be saved to disk and recalled.

In general, acquisition **parameters** are common to all of the instruments; although some of them require the specification of additional **parameters**. ASYSTANT+ displays the current **parameters** on a configuration screen, along with appropriate limitations, and prompts the user for new values. The **parameters** required to set up a general-purpose instrument for a session are trigger type, internal or external clock, number of analog input channels, the first channel in a scan cycle, value for the software gain, the acquisition rate, the number of data points per channel, the number of scans to perform in the session, and the file to be used for data storage (file storage is optional).

Because data acquisition boards typically multiplex several analog input channels through a single analog to digital converter and have limits on the speed a which they can operate, these **parameters** are interrelated. For example, in the high-speed recorder mode, the **maximum** acquisition rate is inversely proportional to the number of channels selected.

ASYSTANT+ extends the operation of its waveform generator to the control of the data acquisition hardware, allowing the system to operate as a function generator. The digital values determined by the function generator are used to produce analog signals with the data acquisition board's digital-to-analog **converter**. The **function** generator provides two output channels, taking arrays stored in **variables** R and S as the input waveforms. The function generator can create standard waveforms, experimental waveforms acquired from earlier sessions, and waveforms that have been processed by any ASYSTANT+ ASYSTANT+'s function generator is capable of providing signals that are not available from conventional analog function generators. It is limited in speed and resolution to a throughput of 300 to 400 points per second.

The function generator can be used as a stand-alone device or in conjunction with other ASYSTANT+ instruments. In either mode, the generator's output can be controlled interactively. As a stand-alone device, it can replace a conventional generator and drive a plotter or real-strip chart recorder to produce a hard copy of a waveform. When used in conjunction with the other instruments, the generator can provide a known stimulus or control signal to the experiment. Using the generator

with other ASYSTANT+ devices can affect the operation of the generator or the other device, reducing the throughput of the acquisition instrument. The program, however, does allow the operator to set the priorities of concurrent tasks.

ASYSTANT+'s strip-chart recorder is a digital replacement for an eight channel strip-chart recorder. The screen display resembles an analog strip-chart recorder with data points that appear at the right edge of the display and move across the screen as if on moving paper. The screen displays only the active channels, providing greater resolution as the number of channels is reduced from the **maximum** of eight.

The strip-chart recorder is limited to a **maximum** throughput of 40 to 70 Hz (points per second in this context), the exact **maximum** rate depends upon the hardware configuration. If the **maximum** number of channels is selected, and data are output to disk concurrently, the throughput is reduced. Thus, the recorder is suited only to slowly varying signals. If data file output is not selected, the data are lost once they scroll off the screen.

While it is operating, the strip-chart recorder can be controlled.

The data acquisition rate and gain can be altered; data file output can be suspended and resumed; and the display resolution can be modified by skipping data points. If the function generator is active, it may also be adjusted.

The XY recorder acquires data from a **maximum** of two channels and displays the data on an xy plot-one channel's input corresponding to the x axis and the other corresponding to the y axis. It is possible to display vertical and horizontal grids either individually or together.

The XY recorder has a higher throughput, ranging from 340 to 670 Hz, than does the strip-chart recorder. The difference in speed is due to the limit of two channels, and to a lack of concurrent data file output that is available only between scan cycles. The user can select a single scan mode in which the recorder pauses to allow data file output or a continuous scan in which data file output is not an option.

The XY recorder can be interactively controlled. While the recorder is acquiring and plotting data, the user can set the acquisition rate and programmable gain, adjust the function generator (if it is enabled), change the display increment and halt the scan. Between scans, data can be saved to disk if data file output was selected; then the next scan can be initiated, and the current scan can be displayed versus time, superimposed on the xy plot.

To acquire data before and after an event in. an experiment, the transient recorder captures and plots analog data in two stages, based on two triggers. It can acquire dam on as many as eight channels with a **maximum** troughput of 340 to 800 Hz. The user must specify two triggers to begin acquisition of data for each stage. The recorder acquires and then plots the dam. As with the XY recorder, data can be output to a disk file only between scans. A continuous mode and active control during operation are available.

The data logger is a low-speed device that provides for analog data input from up to four channels and the control of eight digital lines. Its throughput is limited to 1 Hz. However, concurrent data file output, realtime conversion of voltage to engineering units, and simultaneous hard-copy output are available. Data are displayed in text form on the screen in realtime.

Setting the acquisition **parameters** for the data logger requires three screens instead of the usual one for selecting and configuring the analog input channels. Screens are provided to define from one to four

stages and up to six alarm triggers. The stages allow the acquisition rate and control logic to be varied during the course of an experiment. The alarm triggers control the display of messages and output of userdefined bit patterns on the digital lines according to analog input levels or digital input bit patterns.

The ability to place bit patterns on the digital port allows the data logger to be used as a controller, It can monitor and display up to four process **variables** measured with analog sensors, and it can monitor the states of as many as eight digital, two-position, devices. Based on these conditions, the data logger can provide an eight-bit digital output, which can be used to control eight digital devices or, if suitably converted, an analog device. It cannot directly control a proportional control device.

The high-speed recorder provides the highest sampling rate of the ASYSTANT+ instruments, matched only by the signal averager. Depending upon the data acquisition hardware, the sampling rate may exceed 30 KHz. The sampling rate that is realized is affected by the number of channels specified, as well as by the add-on hardware limitations.

This high-speed recorder performs its tasks sequentially, first acquiring the data, then plotting them on the screen, and finally recording them to disk. Users can disable the screen display to reduce the time between scans. Active control is provided, allowing the data plot to be examined in detail between each of the scans.

The signal averager is similar to the high-speed recorder, offering the same sampling rate and number of channels and storing a cumulative average of multiple scans. It allows data file output only at the end of a session, at which point it stores the current cumlative average. The display is similar to that of the high-speed recorder, however, it shows the current scan and the cumulative average scan superimposed for each channel.

HARDWARE CONSIDERATIONS

ASYSTANT+ runs on the IBM PC family of computers, as well as on compatibles. The full 640KB of RAM supported by PC-DOS must be installed, along with an 8087 or 80287 math coprocessor, two diskette drives or one diskette and one hard-disk drive, and a supported graphics board. Supported graphics boards include the IBM Color Graphics Adapter (CGA), the IBM EGA, the Hercules Graphics Card, the AT&T High-Resolution card, and the HP Vectra Multimode adapter.

The program performs the basic ASYSTANT tasks without installing additional hardware. However, if data acquisition is to be performed, ASYSTANT+ does require that a data acquisition board or external data acquisition chassis be used. Supported data acquisition hardware includes the Cyborg Issac 91I, the Dataq WFS-200PC Waveform Scroller, Data Translation's DT2800 series, IBM's Data Acquisition and Control Adapter, the Keithley Series 500 system, metrabyte's DASH-16 board, and Tecmar's Lab Master and Lab Tender boards. (See "Digitizing Analog Data," Eric M. Miller, May 1986, p. 52 for reviews of some of these products.)

ASYSTANT+ is a demanding program In addition to installing 640KB of RAM, the user must ensure that the **maximum** amount of RAM is available. TSR (terminate and stay resident) programs and device drivers must be kept to a **minimum**; the safest course is to use only the standard DOS configuration.

For this article, ASYSTANT+ was tested on a Heathkit H-241 AT-compatible computer, with 640KB of RAM, 2,176KB of extended memory, an 80287 numeric coprocessor, a Concept Technologies ConceptBoard graphics adapter, and a Data Translation DT2801A data acquisition board.

Although ASYSTANT+ can operate on a dual-diskette system, a hard disk should be considered a practical requirement. Macmillan furnishes ASYSTANT+ on six diskettes--running the program from diskette drives requires frequent swapping of diskettes and severely limits file storage.

Program configuration is an option when the program is first loaded. The program displays a sign-on message and then a menu with options to recall functions, **parameters**, and **variables** from a disk file, to perform hardware configuration, and to begin using the program. The second selection, Setup, displays a configure menu, with options for selecting the display, plotter, and printer, and for disk assignments for the system overlay, data, and help files. The initial installation of the program consists of copying the files from the distribution disks. Configuration is accomplished a the beginning of the initial session and can be repeated a the beginning of any subsequent session.

ASYSTANT+ uses a Straightforward method of configuring and controlling a data acquisition board. However, installation of a data acquisition board in a typical microcomputer system may require the reconfiguration of other boards, the use of a nonstandard configuration of the data acquisition board, or the removal of other boards. Most data acquisition boards are designed and factory-configured to operate in a standard microcomputer system, and ASYSTANT+ assumes the use of a factory-configured board. Microcomputers that have multiple video boards, high-resolution graphics boards, nonstandard mass storage device controllers, mice scanners, and other accessories may be difficult to configure.

The program allows the specification of the I/O address of the data acquisition board, and most data acquisition boards can be jumpered to one of several addresses. Selecting an unused I/O address in a complex system may not be trivial, but it can be accomplished with some research.

To provide high-performance hardware, many data acquisition board companies incorporate circuitry to use the computer's DMA channels, as do the manufacturers of hard-disk controllers, tape backup systems, optical scanners, network interface boards, and other high-performance accessories. The standard PC has four DMA channels, two of which are free for accessories; the XT has only one free channel to support all of the accessories that require DMA services. ASYSTANT+ does not use DMA, but some acquisition boards must be configured to use DMA, The user must pay attention to this issue.

Some data acquisition boards implement a memory mapped addressing scheme rather than an I/O addressing scheme, using the memory above the base 640KB of user RAM.

These boards, designed when it appeared that there were "holes" in the PC's memory map, may conflict with the EGA and other video boards or with other accessories that use normally vacant segments of the memory map.

RATING THE PERFORMANCE

As a calculator, ASYSTANT+ is a high-performance program. Most computational tasks, including matrix operations, are performed almost instantaneously. A few of the advanced operations are slower, but still reasonably fast, requiring a few seconds at most.

As a data acquisition system, ASYSTANT+ realizes the potential of the microcomputer. Critical elements of the program are written in assembly language to attain the highest possible speed of operation. However, a microcomputer is limited by its design as a general purpose computing machine. Overall system throughput is limited by the speed of the data acquisition board, the clock speed of the computer, and the speed with which data can be written to disk. ASYSTANT+ achieves its ultimate

performance, which is essentially the performance limit of the data acquisition accessory, by dedicating the host computer to controlling the accessory and transferring the acquired data to RAM. Graphic displays and disk I/O are performed between acquisition tasks.

ASYSTANT+, a data acquisition board, and a microcomputer will not replace a battery of high-performance, dedicated laboratory instruments. Dedicated instruments are able to offer higher sampling rates, sometimes by factors of hundreds or thousands, than does an ASYSTANT+ data acquisition system. Furthermore, they provide higher accuracy and resolution. As an example, an HP 3852S Data Acquisition and Control System, suitably configured, can acquire 100,000 readings per second and store up to the order of 64,000 readings locally. High-performance digital storage oscilloscopes and waveform analyzers can acquire data at sampling rates of tens of millions of samples per second. Nevertheless, the ASYSTANT+ based system is a sound solution to the data acquisition problem. An example of ASYSTANT+'s uses is given in the accompanying sidebar.

It should be noted that the basic acquisition and analyzing of data is provided by the data acquisition hardware and not the program. The ambitious experimenter/programmer may be able to do quite well without ASYSTANT+; by writing custom software to control the hardware. But the average experimenter, who must concentrate on the task a hand, will find that ASYSTANT+ makes configuring a comprehensive system a relatively straightforward procedure. Writing custom software to match ASYSTANT+'s analysis and presentation capabilities could not be done within a reasonable timeframe.

THE SOFTWARE PACKAGE

ASYSTANT+ comes with seven diskettes. The program is copy protected; a key diskette must be inserted in a diskette drive to load the program. An alternative to the key diskette arrangement is available from Macmillan in the form of a hardware protection device, All of the software can be copied to the hard disk or to the diskette drive with the DOS Copy command.

The manual is a 2-inch, loose-leaf binder with 81/2 by 11-inch pages. It includes a tutorial, a reference section, several appendices, and an index, all separated with tabbed dividers. A hard slipcase is included. Both the printing and packaging are excellent.

The tutorial is thorough and accurate. It guides the user through the essential features of ASYSTANT+. Although the tutorial assumes that the user already has some knowledge of data acquisition, it is suitable for use as a refresher for occasional practitioners, or as an introduction for a determined beginner. The tutorial can be completed in a reasonable amount of time.

The reference section is well organized, closely following the program's menus. It covers the simulated instruments in considerable detail. The user will seldom have to refer to the data acquisition hardware documentation if the hardware is controlled exclusively with ASYSTANT+.

One possible drawback is that the manual is definitely not a mathematics textbook. The advanced math functions available in the calculator are summarized only briefly. Users who occasionally require Bessel functions and fast Fourier transforms may need to keep an assortment of math textbooks handy. The sister product, ASYST, provides a more insightful tutorial for using the mathematical functions.

ASYSTANT+ adds realtime data acquisition capabilities to the ASYSTANT calculator, which rivals any general purpose computational tool, microcomputer-based or not, in terms of speed, ease of use, and functions. The data acquisition capabilities obviously do not match those of dedicated instruments. However, they do provide a comprehensive assortment of

techniques for applications that can tolerate moderate sampling rates and provide these features at much lower cost than dedicated instruments. An ASYSTANT+ system is a well-balanced solution to moderate data acquisition needs and a high-performance solution to analysis needs.

ASYSTANT+: $895

Macmillan Software Company
866 3rd Avenue
New York, NY 10022
212/972-3960

CIRCLE 348 ON READER SERVICE CARD

Victor E. Wright is the manager of process engineering at Luckett & Farley, located in Louisville, Kentucky.

AN ELECTRONIC DETECTIVE

In a practical application, ASYSTANT+ can be used as a sophisticated detective in an industrial plant. As an example, a plant engineer installs a tachometer on a components of a production line, and it produces a clean, square wave. However, when the tachometer is connected to the control panel several hundred yards away, the control panel display is greatly altered and meaningless. The plant engineer connects a microcomputer with a data acquisition board and ASYSTANT+ installed, and finds a signal like the ones shown in figure 1, instead of the square wave.

The plant engineer the takes the ASYSTANT+ equipped microcomputer to the tachometer and measures the signal directly. As expected, its output is normal, the square wave shown on figure 2. Evidently, the signal is being degraded between the tachometer and the control panel. Because the line from the tachometer to the control room is routed through the plant, past various machines and switchgear, the plant engineer is not surprised. The problem and their sources.

With the noisy signal at the control panel and the square wave sampled at the tachometer stored in ASYSTANT+ **variables**, the engineer is ready to begin analyzing the signal. After verifying that the square wave and the noisy signal samples represent the same time interval and the same number of data points, the engineer subtracts the square wave from the composite signal. Subtracting the two arrays stored in the **variables** from each other and storing the result in another variable leaves just the noise that is picked up in the system. The resulting waveform, plotted in figure 3, is still made up of several components.

On a logical hunch, the plant engineer tries subtracting a 60 Hz sine wave, to remove any "power hum". After a few attempts with the wave form processor to get the correct amplitude, the waveform of figure 4 results.

At this point, two components are clearly discernible, a high frequency sine wave riding on a lower frequency sine wave. The frequency of each waveform is easily determined, at least in this simplified example. With the frequencies of these components known, the engineer can set about locating their sources. For a more complicated situation, other methods such as plotting the power spectrum can be used.

--Victor E. Wright

CAPTIONS: Calculator menus. (chart); Data acquisition menu. (chart)

SPECIAL FEATURES: illustration; chart
DESCRIPTORS: Data Acquisition Systems; Data Analysis; software packages; personal computers; Scientific Research; Evaluation; Computer-Aided Engineering; Add-In/On Software; Calculators
SIC CODES: 7372 Prepackaged software
TRADE NAMES: Asystant+ (Computer program)--evaluation

74/9/2 (Item 1 from file: 275)
DIALOG(R)File 275:Gale Group Computer DB(TM)

01605872 SUPPLIER NUMBER: 13887173 (THIS IS THE FULL TEXT)
FASTAT 2.0. (Systat Inc.'s statistical software) (Software Review) (New on the Menu: Reviews) (Evaluation)
Landau, Ted
MacUser, v9, n7, p69(2)
July, 1993
DOCUMENT TYPE: Evaluation ISSN: 0884-0997 LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT; ABSTRACT
WORD COUNT: 1215 LINE COUNT: 00096

ABSTRACT: Systat Inc's $495 FASTAT 2.0 offers a moderate range of **statistical data analysis functions** to business users who have exceeded the capabilities of their spreadsheet but do not need the flair of heavy duty statistics software. Release 2.0 is a considerable improvement over the original **Macintosh** version, which placed a rudimentary shell around a command-line, batch-oriented statistics suite. FASTAT is half the price of the more powerful SYSTAT; users seeking more than FASTAT provides must pay an additional $400 to upgrade. FASTAT's user interface remains somewhat clumsy. Sorting or recoding variables requires data to be saved to a new file, and the program can only have one file open at a time. FASTAT's graphs are somewhat dull, despite promotional claims of presentation-quality graphics.
TEXT:

Inexperienced statisticians gain few advantages with SYSTAT's less costly sibling.

Billed as "easy-to-use statistics for real world analyses," FASTAT is tailored for business users who have out-grown the statistical-analysis capabilities of their spreadsheet programs. At half the price of its more sophsiticated sibling, SYSTAT 5.2, FASTAT 2.0 can save you money if you don't require a full range of statistical procedures.

However, we discovered that despite its scaled-down functionality, FASTAT offers no real ease-of-use advantages to inexperienced statisticians -- it turns out to be every bit as difficult to use as SYSTAT.

Family Resemblance

Although FASTAT and SYSTAT have many of the same menu commands and dialog boxes in common, FASTAT doesn't provide the full range of statistical procedures and graph types that SYSTAT does. Still, FASTAT is no light-weight--the program provides a healthy assortment of statistical tools and graph types, including factor analyses, time-series analyses, regression analyses, factorial ANOVA, scatterplot matrices, 3-D spin **plots**, **probability plots**, and **function plots**.

Both FASTAT and SYSTAT have been substantially improved since their initial releases. The first versions of both programs clearly demonstrated that they were derived from a batch-oriented command-line-based ancestor. The only concession to the graphical environment of the Mac was a surrounding shell comprising a few simple menu commands.

With this new version of FASTAT, however, menu commands and dialog boxes have almost completely replaced the command-line interface. FASTAT's data editor uses a familiar spreadsheetlike format. You can move, copy, past, and edit data sets just as you do in a worksheet. In addition, the company has added a palette of plot tools that lets you enhance graphs.

Exploratory Tools

One of FASTAT 2.0's best new features is its selection of tools for

Sheet 1 of 3

identifying specific points on scatterplot graphs. When you click on a point in a graph, FASTAT highlights the corresponding record in the data editor, which makes it easy to isolate points for further analysis. Similarly, when viewing the results of an analysis, you can Option-click on any variable to bring up a pop-up menu that lists related graphs and statistics for that variable. With the addition of this feature, FASTAT becomes more versatile -- it can serve not only as a traditional hypothesis-testing tool but also as an exploratory-analysis tool.

For those of you who frequently work with data comprising many variables, FASTAT's Define Bundles command is another plus. By letting you **define any variable subset as a bundle**, it eliminates the need to scroll through all variable names to find the ones you want. When you select the bundle, only its variables appear in the **variable-selection list**. You can define as many as five bundles and shift among them by clicking on the bundle **icon**.

Despite these improvements, FASTAT is still cumbersome. For example, sorting and recoding variables often require you to save the converted data to a separate file. To make matters worse, you can't have more than one file open at a time.

No Hot Links

When FASTAT completes an analysis, it places the results in a window. But the window is not hot-linked to the data editor, so you must run a new analysis each time you make a change in the data set. This makes it difficult to compare the effects of adding or deleting data elements. Similarly, to make even a minor modification to a graph (such as adding a best-fitting regression line to a scatterplot), you must recreate the entire analysis from scratch.

Equally irritating, the results of ANOVA analyses completely disappeared when we requested related supplementary analysis. This forced us to redo the initial ANOVA analysis each time we wanted to try an additional supplementary analysis.

If you make a mistake, that's just too bad -- FASTAT's Undo command is rarely active when you need it most. FASTAT does provide extensive context-sensitive on-line help, however, including a general Help window; an Information window, which provides in-context definitions of terms; a Balloon Help-like feature that explains each menu command; and mini help messages in every dialog box.

Unfortunately, FASTAT's manual is not as impressive as the on-line help. For those who are already familiar with statistical procedures, the manual is adequate. But for those users who require a tutorial to help them learn unfamiliar procedures, it falls far short. Here's an example: Although the manual instructs you to select the MGLH (multivariate general linear hypothesis) option to access FASTAT's regression and ANOVA commands, it never explains MGLH. Ironically, the SYSTAT manual devotes an entire chapter to the meaning of this term.

Also, if you want to add a legend to a graph, you must first select the Symbol dialog box and assign separate symbols to each variable. The manual makes no mention of this requirement. Furthermore, the Symbol dialog box requires you to enter numbers that correspond to the symbols -- you can't simply click on the symbols themselves.

Another weakness is in the area of graphing. Although the FASTAT package promotes the program's "presentation-quality graphics," we found the quality not to be on a par with that of other statistical packages in FASTAT's price range.

In order to get data into FASTAT, you can either enter it directly into a data-editor worksheet, import it as a text file, or import it from

Excel.

The Bottom Line

The latest release of FASTAT is a big improvement over the previous version. Its interface is significantly enhanced, although there's still more work to be done before FASTAT fully exploits the Mac's graphical abilities. Improvements aside, FASTAT remains difficult to use.

FASTAT 2.0 provides basic statistical procedures and graphing options and several more-advanced techniques at half the price of its more powerful sibling, SYSTAT. Still, in our view, it would be a better strategy for the company to offer a single midrange program, such as FASTAT, and make more-advanced features available as separate, optional plug-in modules. As it is now, FASTAT users who need more-advanced features must lay out an additional $400 to upgrade to SYSTAT, which duplicates many of the features they already have in FASTAT.

Compared with other midrange statistical programs for the Mac, FASTAT has an interface that puts it at a significant disadvantage. StatView, for example, has a well-designed interface and statistical power that's comparable to FASTAT's. And Data Desk and JMP are better choices than FASTAT if your main requirement is exploratory data analysis.

If your statitical demands are relatively light, a spreadsheet program may be all you need. Excel 4.0, in particular, has beefed up its statistical-analysis power by providing ANOVA and regression tools. By and large, spreadsheet programs offer more-flexible data entry features and more-attractive graphs than statistics programs do.

SYSTAT, however, remains the first choice for those who need the most complete range of sophisticated statistical-analysis procedures and graph types.

SPECIAL FEATURES: illustration; table
COMPANY NAMES: Systat Inc.--Products
DESCRIPTORS: Statistical/Mathematical Software; Evaluation
SIC CODES: 7372 Prepackaged software
TRADE NAMES: Fastat 2.0 (Statistical software)--evaluation
OPERATING PLATFORM: Apple Macintosh
FILE SEGMENT: CD File 275

Sheet 3 of 3

9/3,AB,CM/6 (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS
 00539918
Expert system scheduler and scheduling method.
PATENT ASSIGNEE:
Hughes Aircraft Company, (214911), 7200 Hughes Terrace, Los Angeles,
INVENTOR:
Pearse, Derek, 3713 Pinewood, Bedford, TX 76021, (US)
PATENT (CC, No, Kind, Date): EP 514122 A2 921119 (Basic)
EP 514122 A3 931229
PRIORITY (CC, No, Date): US 704567 910513

ABSTRACT EP 514122 A2
A scheduling system and method for use with training systems. The exemplary embodiment of the scheduler is incorporated into an aircrew training system for a military aircraft. A training system for training aircrews involves the use of academic media such as classrooms, training devices such as ground-based flight simulation trainers, and training flights in the air. In addition, it involves a computer network having terminals located at a central site, a plurality of training sites, and other remote sites The computer data base is located at a central site, and the training facilities are located at training sites. Typically, computer terminals are connected together in a computer network by both dedicated and dial-up telephone lines, and typically the network may employ Intel 80386 machines running UNIX V, release 3.2. The scheduler of the present invention comprises an integrated system of hardware and software which is integrated into the already existing training system. It is embedded as a software subsystem in the training system, and is delivered on a type 80386 integrated circuit based computer element at each training site. (see image in original document)

CLAIMS EP 514122 A3
1. An expert system scheduler for flexibly scheduling training events at a plurality of training sites notwithstanding the occurrence of resource conflicts, each training site comprises one of a plurality of distributed computers that are interconnected by means of an interconnecting link, the plurality of distributed computers interconnected to a central processor including a database, and wherein the remainder of the computers comprise remote processors, and wherein the database comprises: (1) a list of students input from the plurality of remote computers, (2) a list of instructors, and (3) a list of available flight training events, and wherein the availability of the students, the instructors and the available training events vary over time, and wherein the expert system scheduler comprises processing means that are disposed on each of the remote processors, said expert system scheduler comprising:

means for selectively generating a master plan in response to training requests supplied by users, which master plan provides an event flow that specifies target dates for each training event, but does not specify the exact time or resources and does not take into account whether sufficient resources are available on a target date, which training requests inform the scheduler that a specific number of users should be scheduled for a particular training event, and stipulate required starting and ending dates for the events, the master plan providing users with a preview of the proposed event sequence and an overview of all events which are targeted for the same date;

Sheet 1 of 2

means for adjusting the master plan so that users may adjust starting, interim and ending training dates in order to express preferred scheduling constraints;

means for selectively generating a master schedule in response to training requests and the users preferred scheduling constraints which reserves specific dates, times, locations and resources for each training event to fulfill scheduled training requests;

means for generating conflict alerts to notify users if conflicts with the master schedule exist;

means for generating revised training requests in response to conflict alerts; and

means for automatically generating schedule revision options in response to the revised training requests which appropriately reschedule the sites in view of conflicts;

wherein the expert system scheduler flexibly schedules and reschedules training events at each of the sites notwithstanding resource conflicts, and wherein schedules are automatically generated and conflicts resolved.

2. The expert system scheduler of Claim 1 which further comprises:

means for selectively generating schedules indexed on user, instructor, resource, and event in response to user requests.

3. The expert system scheduler of Claim 1 which further comprises:

means for displaying the master plan to provide facilities for users to review and revise the master plan.

4. The expert system scheduler of Claim 1 which further comprises:

means for initializing a workshift calendar and a scheduling **parameters** database that stipulate general scheduling constraints, which **parameters** are used by the scheduler to restrict the dates and times during which resources may be used and to establish priorities by which resources are allocated.

5. An expert system scheduler for flexibly scheduling training events at a plurality of training sites notwithstanding the occurrence of resource conflicts, each training site comprises one of a plurality of distributed computers that are interconnected by means of an interconnecting link, the plurality of distributed computers interconnected to a central processor including a database, and wherein the remainder of the computers comprise remote processors, and wherein the database comprises: (1) a list of students input from the plurality of remote computers, (2) a list of instructors, and (3) a list of available flight training events, and wherein the availability of the students, the instructors and the available training events vary over time, and wherein the expert system scheduler comprises processing means that are disposed on each of the remote processors, said expert system scheduler comprising:

means for selectively generating a master plan in response to training requests supplied by users, which master plan provides an event flow that specifies target dates for each training event, but does not specify the exact time or resources and does not take into account whether sufficient resources are available on a target date, which training requests inform the scheduler that a specific number of users should be scheduled for a particular training event, and stipulate required starting and ending dates for the events, the master plan providing users with a preview of the proposed event sequence and an overview of all events which are targeted for the same date;

Method and apparatus for detecting service anomalies in transaction-oriented networks

Patent number: EP1065827

Publication date: 2001-01-03

Inventor: LAP-WAH LAWRENCE HO (US)

Applicant: LUCENT TECHNOLOGIES INC (US)

Classification:

- international: ***H04L12/24; H04L12/26;*** **H04L12/24; H04L12/26;** (IPC1-7): H04L12/24; H04L12/26

- european: H04L12/24C1; H04L12/24C3; H04L12/24D4; H04L12/24E2; H04L12/26M

Application number: EP20000304995 20000613

Priority number(s): US19990342587 19990629

Also published as:

- US6597777 (B1)
- JP2001057555 (A)
- EP1065827 (B1)

Cited documents:

- WO9624210
- US5377196
- US5559527
- XP000748773

Abstract of **EP1065827**

On a transaction network that supports short-duration electronic transactions within multiple service classes between input terminals and host processors, such as for credit card purchases, a network anomaly detector monitors the network to determine a potential fault either on or off the network before an actual network failure occurs. The network anomaly detector is provided with current transaction data for ongoing transactions, which data for each transaction includes the service class of the transaction, the start time of the transaction and the duration of the transaction. The current transaction data is converted to a traffic intensity, which provides a temporal measure of the traffic on the network within each predetermined binning interval for each service class. For each service class, that binning interval is computed by the detector as a function of the median of the durations of transactions having the same service class from past transaction data so that a large percentage of transactions would statistically be expected to have a duration less one interval. That binning interval is also used to convert historical transaction data for each class into temporal upper and lower traffic intensity thresholds. If the traffic intensity generated from current data exceeds the upper threshold or falls below the lower threshold by longer than a predetermined time, an alarm is sounded to indicate an anomaly. Corrective action can then be taken to remove the anomalous condition. Periodically, the historical data used to generate the upper and lower thresholds is updated with more recent transaction data so that the thresholds more closely follow current data trends.

METHODS AND APPARATUS FOR CALCULATING AND PRESENTING THE PROBABILISTIC FUNCTIONAL MAPS OF THE HUMAN BRAIN

Patent number: WO02093292

Publication date: 2002-11-21

Inventor: NOWINSKI WIESLAW L (SG); BIALOU DZMITRY (SG)

Applicant: KENT RIDGE DIGITAL LABS (SG); NOWINSKI WIESLAW L (SG); BIALOU DZMITRY (SG)

Classification:

- international: *A61B5/0476; G06F17/10; G06F17/18; G06F19/00;* A61B5/0476; G06F; G06F17/10; G06F17/18; G06F19/00; (IPC1-7): G06F

- european:

Application number: WO2002SG00023 20020218

Priority number(s): SG20010002872 20010514

Also published as:

- WO02093292 (A3)
- US2004210124 (A1)

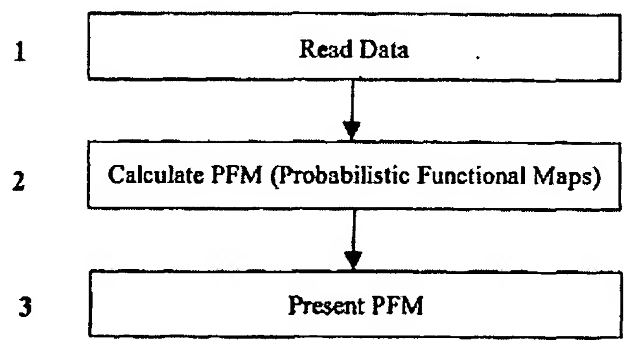
Cited documents:

- EP0477434
- DE4326043
- RU2177716

Report a data error here

Abstract of **WO02093292**

The present invention proposes a method for calculating, presenting, and combining probabilistic functional maps (PFMs) of the human brain representing the probability of structures existing. The method comprises three major steps: reading of data containing the coordinates of contacts, calculating the PFMs, and presenting he PFMs. The data can be read from a file in text or binary format or from a database as local or remote client. The PFM calculation comprises the following steps: forming 3D models of contacts, normalizing the contact models, voxelizing the contact models, calculating an atlas function, and calculating the PFM. The PFM can be presented alone or along with anatomical atlases. Both 3D and 2D interfaces can be used for presentation. The proposed method also includes different ways of combining the contact data and/or existing PFMs from multiple sources. This mechanism is the basis of an internet portal for stereotactic and functional neurosurgery.



METHOD AND APPARATUS FOR DETERMINING THE HEALTH OF A COMPONENT USING CONDITION INDICATORS

Patent number: WO02095633

Publication date: 2002-11-28

Inventor: BECHHOEFER ERIC ROBERT; HOCHMANN DAVID

Applicant: SIMMONDS PRECISION PRODUCTS (US)

Classification:

- international: ***G01H1/00; G01N29/11; G01N29/12; G01N29/44; G01N29/46; G05B23/02;*** **G01H1/00; G01N29/04; G01N29/12; G01N29/44; G05B23/02**; (IPC1-7): G06F17/40

- european: G01H1/00B; G01N29/11; G01N29/12; G01N29/44D; G01N29/46; G05B23/02

Application number: WO2002US16380 20020523

Priority number(s): US20010293331P 20010524; US20010011787 20011204; US20010011622 20011204; US20010011973 20011204; US20010011428 20011204; US20010011905 20011204; US20010011864 20011204

Also published as:

WO02095633 (A3)
EP1390739 (A3)
EP1390739 (A2)
CA2439734 (A1)

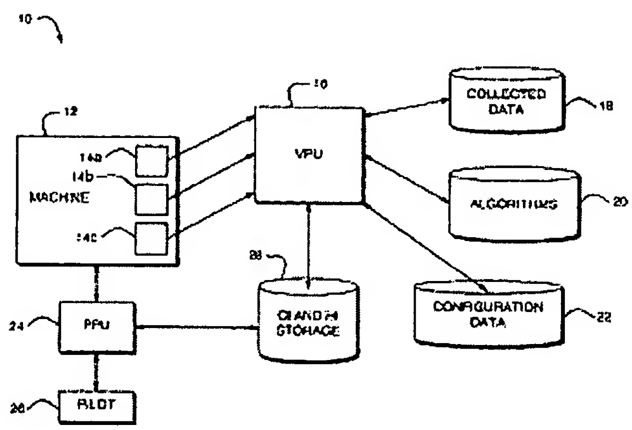
Cited documents:

WO9954703
US6014652
DE4207728

Report a data error here

Abstract of **WO02095633**

Disclosed are techniques used in connection with determining a health indicator (HI) of a component, such as that of an aircraft component. The HI is determined using condition indicators (CIs) which parameterize characteristics about a component minimizing possibility of a false alarm. Different algorithms are disclosed which may be used in determining one or more CIs. The HI may be determined using a normalized CI value. Techniques are also described in connection with selecting particular CIs that provide for maximizing separation between HI classifications. Given a particular HI at a point in time for a component, techniques are described for predicting a future state or health of the component using the Kalman filter. Techniques are described for estimating data values as an alternative to performing data acquisitions, as may be used when there is no pre-existing data.



Data supplied from the *esp@cenet* database - Worldwide

http://vireo.gatech.edu/local/matlab/help/pdf_doc/stats/stats.pdf

Statistics Toolbox for Use with MATLAB

Version 4.0

6th printing dated July 2002

700 pages in this file

Downloaded and printed from the Internet on 1/20/2006.

Table of Contents + Intro are attached

Statistics Toolbox

For Use with MATLAB®

Computation

Visualization

Programming

User's Guide

Version 4

The MathWorks

How to Contact The MathWorks:

`www.mathworks.com`	Web
`comp.soft-sys.matlab`	Newsgroup
`support@mathworks.com`	Technical support
`suggest@mathworks.com`	Product enhancement suggestions
`bugs@mathworks.com`	Bug reports
`doc@mathworks.com`	Documentation error reports
`service@mathworks.com`	Order status, license renewals, passcodes
`info@mathworks.com`	Sales, pricing, and general information
508-647-7000	Phone
508-647-7001	Fax
The MathWorks, Inc. 3 Apple Hill Drive Natick, MA 01760-2098	Mail

For contact information about worldwide offices, see the MathWorks Web site.

Statistics Toolbox User's Guide

Printing History:			
	September 1993	First printing	Version 1
	March 1996	Second printing	Version 2
	January 1997	Third printing	For MATLAB 5
	January 1999	Online only	Revised for Version 2.1.2 (Release 11)
	November 2000	Fourth printing	Revised for Version 3.0 (Release 12)
	May 2001	Fifth printing	Minor revisions
	July 2002	Sixth printing	Revised for Version 4.0 (Release 13)

Contents

Preface

1 Introduction

2 Probability Distributions

3 Descriptive Statistics

4 Linear Models

5 Nonlinear Regression Models

6 Hypothesis Tests

7 Multivariate Statistics

8 Statistical Plots

9 Statistical Process Control

10 Design of Experiments

11 Demos

12 Reference

Preface

How to Use This Guide

This guide introduces the MATLAB statistics environment through the toolbox functions. It describes the functions with regard to particular areas of interest, such as probability distributions, linear and nonlinear models, principal components analysis, design of experiments, statistical process control, and descriptive statistics. It also describes use of the graphical tools.

"Introduction"	Introduces the toolbox, and explains the mathematical notation it uses.
"Probability Distributions"	Describes the distributions and the distribution-related functions supported by the toolbox.
"Descriptive Statistics"	Explores toolbox features for working with descriptive statistics such as measures of location and spread, percentile estimates, and data with missing values.
"Linear Models"	Describes toolbox support for one-way, two-way, and higher-way analysis of variance (ANOVA), analysis of covariance (ANOCOVA), multiple linear regression, stepwise regression, response surface prediction, ridge regression, and one-way multivariate analysis of variance (MANOVA). It also describes support for nonparametric versions of one- and two-way ANOVA, and multiple comparisons of the estimates produced by ANOVA and ANOCOVA functions.
"Nonlinear Regression Models"	Discusses parameter estimation, interactive prediction and visualization of multidimensional nonlinear fits, and confidence intervals for parameters and predicted values. It also introduces classification and regression trees as a way to approximate a regression relationship.
"Hypothesis Tests"	Describes support for common tests of hypothesis – t-tests, Z-tests, nonparametric tests, and distribution tests.
"Multivariate Statistics"	Explores toolbox features that support methods in multivariate statistics, including principal components analysis, factor analysis, one-way multivariate analysis of variance, cluster analysis, and classical multidimensional scaling.

"Statistical Plots"	Describes box plots, normal probability plots, Weibull probability plots, control charts, and quantile-quantile plots which the toolbox adds to the arsenal of graphs in MATLAB. It also discusses extended support for polynomial curve fitting and prediction, creation of scatter plots or matrices of scatter plots for grouped data, interactive identification of points on such plots, and interactive exploration of a fitted regression model.
"Statistical Process Control"	Discusses the plotting of common control charts and the performing of process capability studies.
"Design of Experiments"	Discusses toolbox support for full and fractional factorial designs, response surface designs, and D-optimal designs. It also describes functions for generating designs, augmenting designs, and optimally assigning units with fixed covariates.
"Demos"	Describes GUIs that enable you to explore the probability distributions, random number generation, curve fitting, and design of experiments functions.
"Reference"	Lists the functions for each area supported by the toolbox, and provides a complete description of each function.
"Selected Bibliography"	Lists published materials that support concepts described in this guide.

Information about specific functions and tools is available online and in the PDF version of this document. For functions and graphical tools, reference descriptions include a synopsis of the syntax, as well as a complete explanation of options and operation. Many reference descriptions also include examples, a description of the function's algorithm, and references to additional reading material. "Demos" on page 11-1 further describes the use of the graphical tools.

Related Products List

The MathWorks provides several products that may be relevant to the kinds of tasks you can perform with the Statistics Toolbox.

For more information about any of these products, see either:

- The online documentation for that product if it is installed or if you are reading the documentation from the CD
- The MathWorks Web site, at `http://www.mathworks.com`; see the "products" section

Note The toolboxes listed below all include functions that extend the MATLAB capabilities. The blocksets all include blocks that extend Simulink's capabilities.

Product	Description
Data Acquisition Toolbox	Acquire and send out data from plug-in data acquisition boards
Database Toolbox	Exchange data with relational databases
Financial Time Series Toolbox	Analyze and manage financial time series data
Financial Toolbox	Model financial data and develop financial analysis algorithms
GARCH Toolbox	Analyze financial volatility using univariate GARCH models
Image Processing Toolbox	Perform image processing, analysis, and algorithm development
Mapping Toolbox	Analyze and visualize geographically based information

Product	Description
Neural Network Toolbox	Design and simulate neural networks
Optimization Toolbox	Solve standard and large-scale optimization problems
Signal Processing Toolbox	Perform signal processing, analysis, and algorithm development
System Identification Toolbox	Create linear dynamic models from measured input-output data

Typographical Conventions

This manual uses some or all of these conventions.

Item	Convention	Example
Example code	`Monospace font`	To assign the value 5 to `A`, enter `A = 5`
Function names, syntax, filenames, directory/folder names, and user input	`Monospace font`	The `cos` function finds the cosine of each array element. Syntax line example is `MLGetVar ML_var_name`
Buttons and keys	**Boldface** with book title caps	Press the **Enter** key.
Literal strings (in syntax descriptions in reference chapters)	**`Monospace bold`** for literals	`f = freqspace(n,'`**`whole`**`')`
Mathematical expressions	*Italics* for variables Standard text font for functions, operators, and constants	This vector represents the polynomial $p = x^2 + 2x + 3$.

MATLAB output	`Monospace font`	MATLAB responds with
		`A =`
		`5`

Menu and dialog box titles	**Boldface** with book title caps	Choose the **File Options** menu.
New terms and for emphasis	*Italics*	An *array* is an ordered collection of information.
Omitted input arguments	(...) ellipsis denotes all of the input/output arguments from preceding syntaxes.	`[c,ia,ib] = union(...)`
String variables (from a finite list)	*`Monospace italics`*	`sysc = d2c(sysd,'`*`method`*`')`

1

Introduction

What Is the Statistics Toolbox?

The Statistics Toolbox, for use with MATLAB, supplies basic statistics capability on the level of a first course in engineering or scientific statistics. The statistics functions it provides are building blocks suitable for use inside other analytical tools.

The Statistics Toolbox is a collection of tools built on the MATLAB" numeric computing environment. The toolbox supports a wide range of common statistical tasks, from random number generation, to curve fitting, to design of experiments and statistical process control. The toolbox provides two categories of tools:

- Building-block probability and statistics functions
- Graphical, interactive tools

The first category of tools is made up of functions that you can call from the command line or from your own applications. Many of these functions are MATLAB M-files, series of MATLAB statements that implement specialized statistics algorithms. You can view the MATLAB code for these functions using the statement

```
type function_name
```

You can change the way any toolbox function works by copying and renaming the M-file, then modifying your copy. You can also extend the toolbox by adding your own M-files.

Secondly, the toolbox provides a number of interactive tools that let you access many of the functions through a graphical user interface (GUI). Together, the GUI-based tools provide an environment for polynomial fitting and prediction, as well as probability function exploration.

Primary Topic Areas

The Statistics Toolbox has more than 200 M-files, supporting work in these topical areas:

Probability Distributions

The Statistics Toolbox supports 20 probability distributions. For each distribution there are five associated functions. They are

- Probability density function (pdf)
- Cumulative distribution function (cdf)
- Inverse of the cumulative distribution function
- Random number generator
- Mean and variance as a function of the parameters

For data-driven distributions (beta, binomial, exponential, gamma, normal, Poisson, uniform, and Weibull), the Statistics Toolbox has functions for computing parameter estimates and confidence intervals.

Descriptive Statistics

The Statistics Toolbox provides functions for describing the features of a data sample. These descriptive statistics include measures of location and spread, percentile estimates and functions for dealing with data having missing values.

Linear Models

In the area of linear models, the Statistics Toolbox supports one-way, two-way, and higher-way analysis of variance (ANOVA), analysis of covariance (ANOCOVA), multiple linear regression, stepwise regression, response surface prediction, ridge regression, and one-way multivariate analysis of variance (MANOVA). It supports nonparametric versions of one- and two-way ANOVA. It also supports multiple comparisons of the estimates produced by ANOVA and ANOCOVA functions.

Nonlinear Models

For nonlinear models, the Statistics Toolbox provides functions for parameter estimation, interactive prediction and visualization of multidimensional nonlinear fits, and confidence intervals for parameters and predicted values. It

provides functions for using classification and regression trees to approximate regression relationships.

Hypothesis Tests

The Statistics Toolbox also provides functions that do the most common tests of hypothesis — t-tests, Z-tests, nonparametric tests, and distribution tests.

Multivariate Statistics

The Statistics Toolbox supports methods in multivariate statistics, including principal components analysis, factor analysis, one-way multivariate analysis of variance, cluster analysis, and classical multidimensional scaling.

Statistical Plots

The Statistics Toolbox adds box plots, normal probability plots, Weibull probability plots, control charts, and quantile-quantile plots to the arsenal of graphs in MATLAB. There is also extended support for polynomial curve fitting and prediction. There are functions to create scatter plots or matrices of scatter plots for grouped data, and to identify points interactively on such plots. There is a function to interactively explore a fitted regression model.

Statistical Process Control (SPC)

For SPC, the Statistics Toolbox provides functions for plotting common control charts and performing process capability studies.

Design of Experiments (DOE)

The Statistics Toolbox supports full and fractional factorial designs, response surface designs, and D-optimal designs. There are functions for generating designs, augmenting designs, and optimally assigning units with fixed covariates.

Statistical analysis of sequences [Word-71K]
Apr 2002
...on a number of **parameters**, for example...different alignment **parameters**. This is one achievement...from the same **probability function**. We wish to determine...the walk is not **predetermined** to begin with...There are two **parameters** in the theory...alignment will reach a **maximum value** We consider a...

[http://www.cs.cornell.edu/courses/cs626/2002sp/chapter...]

Chapter III. Statistical analysis of sequences

Here we are taking the statistical analysis of sequences (that we started when considering the significance of the alignment) one step further. The high point of the discussion is the most popular alignment algorithm: BLAST (Basic Local Alignment Search Tool). The theory of BLAST is quite complex and full account of the theory is beyond the scope of the present discussion. Nevertheless, we will outline the main ideas and the formulas that are used. We start with yet another look at the statistical argument that we used when evaluating the significance of the scores.

The score of an alignment $T = \sum_{i=1}^{n} s\left(\bar{a}_i, \bar{b}_i\right)$ is a sum of individual entries to a substitution matrix, substitutions that may include gaps. The BLAST algorithm suggests an approximate statistical estimate for the significance of the above score. Before going into an in depth discussion on BLAST it is useful to outline the conceptual analogy to the Z score analysis and the relative advantages and disadvantages of the two approaches. In the Z score formulation we test if the score is significantly higher than a typical score of a random sequence. Alternatively, we ask what is the probability to obtain by chance a Z score higher than a threshold value Z_{th}? By "high score by chance" we mean a high scoring alignment of a probe sequence against a random sequence sampled from a distribution of individual amino acids, $p(a_i)$.

Let the probability of observing a Z score between Z and $Z + dZ$ by chance be $p_Z(Z)dZ$ ($p(Z)$ is the probability density). The answer to the above question is therefore $P_Z(Z > Z_{th}) = \int_{Z_{th}}^{\infty} p_Z(Z)dZ$

The smaller is $P_Z(Z > Z_{th})$ the less likely it is that the observed score Z was obtained by chance. This is in principle a simple test for significance. However, there is a complication in practice, which is the unknown functional form of $p(Z)$. A possible solution to the problem is based on numerical experiments. We may compute a large sample of alignments of pairs of sequences **that are not related**. The sample will be used to estimate the probability density (e.g. by counting the number of times that we observed Z scores between Z and $Z + \Delta Z$, $n(Z)$, dividing it by the total number of alignments N, and by the interval, ΔZ).

The consideration of the dimensionless entity, Z, versus the direct score, T, is especially useful in estimates of the probability density. The reference to a single variable, which does not depend strongly on the sequence length, makes the numerical estimates of the model easier and more straightforward. For example, the score, T, clearly depends on the length and so is the probability density $p_T(T)$.

Note that in the numerical evaluation described above we use the term "unrelated sequences". These are not necessarily "random" sequences sampled from distribution of individual amino acids but are true protein sequences that are unrelated to the probe sequence. In other words we changed the reference or the background distribution to reflect the distribution of real proteins. The use of random sequences enters only in the second phase when we evaluate the Z score of one alignment (a pair of sequences). One of the protein sequences undergoes shuffling (randomization of the positions of the amino acids) and an optimal score is computed between the probe and the random sequences. The optimal scores of alignments against random sequences (derived from a single match of the probe sequence into one of the sequences in the database) are used to compute one Z score.

The distribution function, $P(Z > Z_{th})$, can be computed only once prior to any calculation and used ever after. Besides the probability of the prediction being a false positive it is also possible to estimate the probability of being true positive. This can be done only by numerical experiments since there is no analytical theory for true positives.. For that purpose we compute the distribution function of Z scores of alignments between **related** sequences. That is, we ask the double question (and provide numerical estimate): What is the probability that the computed Z score is a false positive and at the same time is a true positive? We hope that the answer to the first question is very low and the answer to the second question is very high.

Ideally the distribution of the false positive and true positive will have zero overlap.

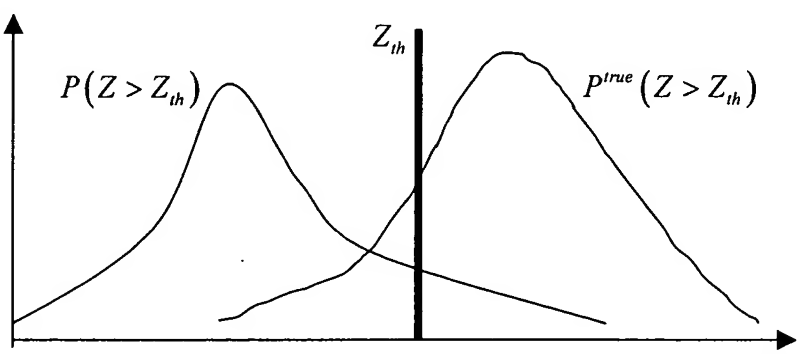


Figure X: Schematic drawing of overlapping distribution of false and true positives. Ideally we should have a score that is "only" true or "only" false. Typically we accept some probability of false positives to minimize the lost of true positives. The score Z_{th} determines the selection boundary.

In practice, however, this is not the case. The choice of the threshold score Z_{th} that we use to decide if to accept the prediction as true is done to minimize $P(Z > Z_{th})$ and maximize $P^{true}(Z > Z_{th})$. Clearly, the two functions provide complementary information.

The above procedure that is based on numerical calculations of the distribution functions for false and true positives and the careful selection of a threshold value is very reliable. However, (and this is a BIG however), the process is expensive and is difficult to use in

large-scale prediction schemes. The reason is **not** the calculation of the distribution function that is done only once and used ever after but the calculation of the Z score itself. Each calculation of a Z score requires the alignment of tens to a thousand of random sequences. If a single alignment costs about 0.01 to 0.1 second on a 700 MHz PC then a comparison of two sequences (including the Z score estimate) will take tens of seconds. And a search of one sequence against a small database of (say) ten thousand proteins will take about a day. Of course large-scale comparisons between many genes against larger databases becomes impossible with such timing. One way of reducing the computational efforts is to compute the Z scores only for high scoring alignments. However, in order not to miss true positive we still need to examine many high score alignments and the relief provided by the above heuristic is limited.

If the task at hand is of genomic scale analysis, namely, the study of ten to hundreds of millions of alignments, then even dynamic programming (computing only the T scores) can be too expensive.

An intermediate conclusion is therefore that the statistical arguments so far have led to more reliable predictions but not to more efficient calculations.

It is possible to use the general idea of statistical significance to design a more efficient alignment algorithm. The twist here is **not** to check the statistical significance of an optimal alignment that was obtained by dynamic programming, but to create an approximate alignment using statistical consideration. We design an approximate alignment procedure that will pick alignments with high statistical significance. As explained below the resulting algorithm is considerably more efficient than dynamic programming at the expense of using approximations. On the hand, the incorporation of statistical arguments into the alignment procedure makes the final decision, (true or false positive?), better than a decision that is based only on the T score. Hence even if the alignment is not optimal the assessment that the two sequences are indeed related by statistical significance is typically pretty good.

We consider first the score T of an alignment and the probability density of the score $p(T)$. The T score is considerably less expensive to compute compared to the Z score, and in that sense it is more attractive. However, the T score depends strongly on a number of parameters, for example, the sequence length. It is necessary to develop a theory that will examine the dependence of the score T on different alignment parameters. This is one achievement of the BLAST algorithm: the development of a statistical theory of the T scores. We shall discuss the theory later after understanding how the efficiency of match finding is achieved.

Even if we have an exact theory of the statistical significance of a score (and we do not, the BLAST theory is approximate), we still need to select (efficiently) a high scoring alignment in order to assess its significance. A clever idea of BLAST is to perform a search for high scoring <u>short</u> segments using gapless local alignments. The statistical significance test makes it possible to estimate if the short matches are meaningful and worth exploring further.

Efficient scanning of sequences in BLAST

Consider for example the short segment WWWW that is found in both the probe sequence and one of the sequences in the database. Even though the match is found in fragments that are short (and typically shorter segments are less significant), here it is likely to be significant. Tryptophan is a rare residue, which is unlikely to be mutated by another. Therefore, if we have a match for four tryptophans the match is unlikely to be by chance, and is more likely to indicate true relationship between the two sequences. Note that these short segments for which we find matches need not be identical. For example in the above example we may consider WFWW as also a match using scores from the usual substitution matrices. The quantification of "likely" and "unlikely" is at the core of the BLAST statistical estimates. Let us accept for the moment that we can quantify the statistical significance of matching of short segments and consider the problem of efficiency.

Matches for short segments can be search efficiently. Many technical adjustments to the idea we describe below are possible, however for sim0licity we focused on the most obvious solution rather than on the most efficient.

One simple idea is to use hash tables and to pre-process the database of annotated proteins (we consider now the problem of seeking a match of an unknown sequence against a large database). Consider a segment of length four. There are $20^4 = 160000$ possible different segments. This number is large but not impossible. We prepare pointers for all possible four characters of the probe sequence. The database is scanned (number of operations of order of $O(N)$ where N is the size of the database), and every fragment of length 4 of the database is immediately tested against the probe sequence using the pointers. We comment that with advance hard disks with rapid access or large memory it is possible to preprocess the entire database and to arrange pointers to the locations of all fragments in the database. In that case the probe sequence analysis will include the calculation of the pointers that will immediately bring us to the matches at the large database. The number of operation is therefore $O(L)$ where L is the length of the probe sequence! Sounds great. Nevertheless, the limiting factor in this case may be the rate of disk access.

The pointer is not limited to identical matches but can also point to all other possible matches that score above a certain threshold T_T. Clearly a high threshold will make our life considerably simpler since only a relatively small number of matches will be found that will require further examination in the next step. However, the small number of matches will make the next phase of extending the match, considerably more difficult. The choice of the threshold T_T is a compromise.

Once high scoring segments were identified (hopefully their number is not too large...) the next step is to try to extend them beyond the pre-determined size of a fragment (in our discussion so far it was 4) while maintaining the significance of the (high scoring) alignment. It is important to emphasize that we are left now with considerably smaller number of sequence pairs to probe, which makes the efficient execution of the first step

even more important. The extension of the high scoring fragment can be made (again for example) using dynamic programming and gaps, attempting to link more than one high scoring segment. Hence, it is useful to examine not only individual high scoring segments but also to consider (or put even higher significance) those that are close to each other. The disadvantage of using dynamics programming is the slowing down of the search procedure. In practice direct extension of the matched parts (no gaps) seems to detect sequence relationships quite efficiently, so it is not obvious if the (expensive) implementation of dynamic programming was worth it.

It is clear that the cost of the second step should depend only weakly on the database size (the number of potential matches that we find will depend on the database size). As a result BLAST searches are efficient.

Brief statement of BLAST statistical framework

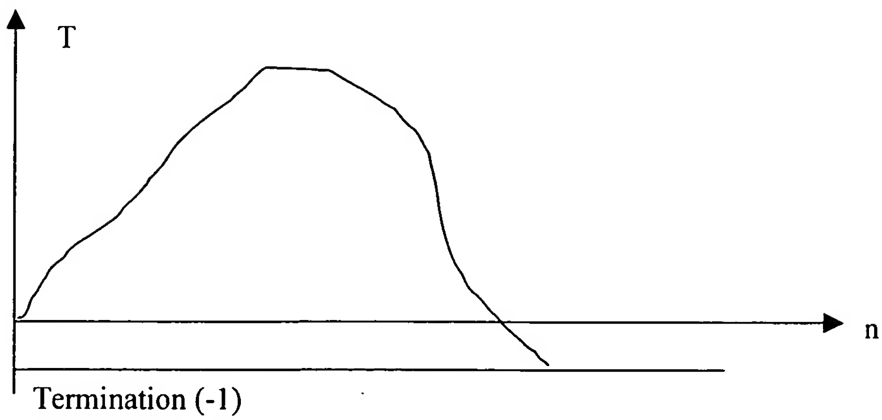
The theory behind BLAST that we shall considers next provide us with an estimate of the probability that two random sequences of length n and m will score more than T_T. To make our match unusual and more likely to be biologically significance this probability better be small.

In the present approach we restrict ourselves to local alignments only

We consider the score, T, aligning two sequences $A = a_1...a_n$ and $B = b_1...b_n$,

$T = \sum_i^n s(a_i, b_i)$ where the matrix elements, $s(a_i, b_i)$, are the appropriate entries to the BLOSUM matrix. We assume that the entries are uncorrelated and therefore the score T is a sum of uncorrelated random numbers that are sampled from the same probability function. We wish to determine the probability that an observed score T_{obs} was obtained by chance.

It is useful to think on the score as a random walk in which the change from T_i to T_{i+1} are the changes induced by one step of the walker. Since the alignment we consider is local the length of the walk is not predetermined to begin with, and nor is the score. We terminate the alignment when further build-up of the alignment does not seem to be helpful. In our case it is when T_i reaches a negative value (-1). Previously we terminate at the value of zero. The choice of different (low) termination values depends on the choice of the substitution matrix. At the least we require that the average value of the substitution matrix (over all elements), $\langle s(a,b) \rangle = \sum p_a p_b s(a,b)$, is negative. The probabilities p_a or p_b are the "background" probabilities for individual amino acids. The average should be 0 since for sufficiently large n the score of the alignment is roughly $T \approx n \cdot \langle s(a,b) \rangle$. To ensure that the length of the alignment is finite the average of the substitution matrix, $\langle s(a,b) \rangle$ must be negative, otherwise the score and the length may grow to infinite.



A schematic presentation of a random walk that represent a (random) alignment. The alignment starts at zero and then terminates when it reaches the value of -1. No termination for an upper bound is assumed, however, since the substitution matrix is negative on the average, the alignment should terminate at finite length n.

In BLAST we address the following questions:

(i) What is the probability of obtaining a maximum score of an alignment, T_T, by chance before the alignment reaches -1 (i.e. what is the probability that the alignment is not significant).

(ii) What is the distribution of alignment lengths before they are terminated (by hitting the absorbing boundary at -1)

We will not follow the theory in all its glory, since some of the arguments are too complex to be included in the present discussion. However, we will outline a few simple examples demonstrating the main idea behind the BLAST approach. Before continuing we provide first the main result of the statistical theory.

The probability to obtain by chance a score T larger or equal to T_T is

$$P(T > T_T) = 1 - e^{-y}$$

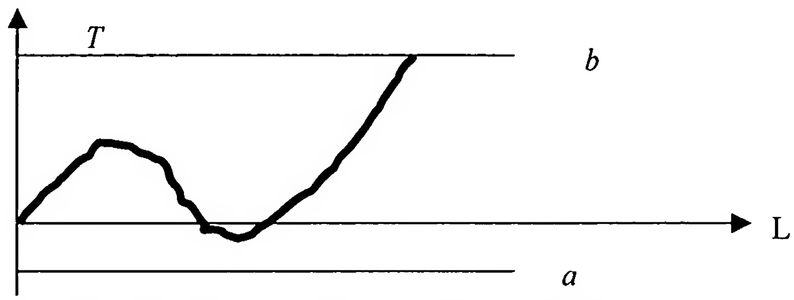
where $y = K \cdot m \cdot n \cdot \exp[-\lambda T_T]$

It is expected that the maximal score by chance will depend on the length of the sequence, and indeed m and n are the lengths of the two sequences. There are two parameters in the theory, K and λ, that require further discussion. For example λ , which is a simpler parameter, is determined by the expression

$$\sum_i p_i p_j' \cdot \exp\left[\lambda s_{ij}\right] = 1$$

Hence, the parameter, λ, determines the scale of the substitution matrix.

It is useful to think on the score as a result of a random walk. In that case we may ask what is the probability that the walk will be terminated at a given upper bound instead of a lower bound. Hence we consider a random walk between two absorbing boundaries. The lower bound is a and the upper boundary is b (note that in BLAST we consider only the lower boundary a which is set to -1. The upper boundary here is added for convenience). We start our walk in the space of scores at zero. When no amino acids are aligned against each other (the beginning) then the total score is zero by definition.



A schematic presentation of a walk in score space. We always start at zero and terminate either at the lower boundary a, or the upper boundary b. We ask what is the probability f_0 that the walk will terminate at b and not on a. Clearly the higher is b (keeping a fixed) the lower is the probability of hitting b before a.

The probability that an alignment will reach a maximum value

We consider a walk (extension of the length of the alignment) that starts at score zero and at length zero. The probability and the magnitude of a step (an element of the BLOSUM matrix for a pair of amino acids) have significant variations for real data. However, to keep the discussion below simple we consider a model in which only steps of ± 1 are allowed. Of course there are many more possibilities for real data but we can still imagine dividing the amino acids into two groups: hydrophobic H and hydrophilic P. If the pair under consideration is of the same type (i.e. H/H or P/P), then the score is set to +1, if it is a miss (H/P or P/H) then the score is –1. Since the H/P model was used successfully in a number of simplified and semi-quantitative models, it is expected to work similarly in the present case.

(Note however, that there is a fundamental problem in the above suggestion if all the pairs are equally probable. A possible correction is to set the score of P/P to zero. Can you explain why?)

The probability of going a step up is p and a step down is q. Let f_i be the probability that the walk terminates at the upper bound b instead of the lower bound a starting from position i. After a single step we may reach with probability p the $i+1$ position and with a probability q the $i-1$ position. Since the probability of termination at the upper boundary should conserve, we have

$$f_i = pf_{i+1} + qf_{i-1}$$

with the boundary conditions: $f_a = 0$ and $f_b = 1$.

As usual it is easy to guess a solution of the type $f_i = \exp[i \cdot \theta]$ for the above homogenous equation. We have

$$\exp[i \cdot \theta] = p \exp[(i+1)\theta] + q \exp[(i-1)\theta]$$

multiplying on both sides by $\exp[(1-i)\theta]$ we have

$$p \exp[2\theta] - \exp[\theta] + q = 0$$

for $p \neq q$ we have two solutions: $\theta = 0$ and $\theta = \log(q/p)$. The general solution is a linear combination of the two, which is

$$f_i = A_1 + A_2 \exp[i \cdot \log(q/p)]$$

The coefficient A_1 and A_2 are determined by the boundary conditions $f_a = 0$ and $f_b = 1$
We write the solution below for the probability starting at zero.

$$f_0 = \frac{1 - \exp(a \cdot \log(q/p))}{\exp(b \cdot \log(q/p)) - \exp(a \cdot \log(q/p))}$$

For sufficiently high b (b □ a) we have (we also set $a = -1$)

$$f_0 = (1 - p/q)\exp(-b \cdot \log(q/p))$$

Note that we already have a condition: $q > p$. Explained. Without this condition the results of the last equation will be meaningless. The probability of hitting an upper boundary is exponentially small. Of course this is what we should expect from a random walk. In sequence alignments it means that high scoring segments can easily have vanishing small probabilities of being false positive. This probability is the geometric distribution and makes the core of the statistical arguments about random alignments.

Length of an alignment

Another fun question that we can ask is what is the typical length of the alignment. Assume that we are at position i like before and the number of steps that the walk takes (before terminating either at -1, or at b) is L_i. After one step the walk will be at position $i-1$ with a probability q and at position $i+1$ with a probability p. The length of remaining walk after this single step is $L_i - 1$. Summarizing in a difference equation we have

$$L_i - 1 = qL_{i-1} + pL_{i+1}$$

Since the equation now is inhomogeneous, the solution is a linear combination of the homogenous solutions (that we saw before) and special solution. We have

$$L_i = \frac{i}{q-p} + A_1 + A_2 \exp[i \cdot \log(q/p)]$$

If the walk starts at $a = -1$ or at b hen it is terminated immediately and the walk length is zero. We therefore have the conditions $L_a = L_b = 0$, which are sufficient to obtain the final solution for the length of the alignment starting at zero.

$$L_0 = \frac{f_0 \cdot b + (1 - f_0)a}{q - p}$$

The extreme value distribution

A single alignment may include more than a single maximum before hitting the termination point. Alignment (and a random walk) can go up and down several times before reaching the absorbing boundary a. We usually pick the local alignment with the largest score and trace it back from that position. It is therefore insufficient to find an arbitrary maximum of the alignment. We need instead to determine the maximum of the maxima. Consideration of the probability of the maximum of the maxima requires a little bit of more work that is outlined below.

Consider a set of N random numbers that are independent and sampled from the same distribution function - $\{T_1, T_2, ..., T_N\}$. With respect to the alignments we assume that the maxima along the walk are independent. One of these numbers is larger than the rest, and we call it $T_{\max}$. The random numbers (local maxima of the alignment) T_i-s are assumed for simplicity to be continuous and sampled from a probability density, $p(T)$; $T \in [-\infty, \infty]$; $\int_{-\infty}^{\infty} p(T)dT = 1$. We are asked to compute the probability density of $T_{\max}$, $p_{\max}(T_{\max})$. This probability can be estimated using computer experiments as follows: Generate N random numbers sampled from the $p(T)$ probability density. From the N random numbers we select the maximum, $T_{\max}(1)$. This experiment is repeated; say L times, to produce L maximal numbers $\{T_{\max}(j)\}_{j=1}^{L}$. The resulting numbers are histogrammed to estimate their probability density, $p(T_{\max})$.

Analytically the following procedure is used to estimate $p(T_{\max})$ from $p(T)$. We consider the distribution functions $Q_{\max}(T)$ and $Q(T)$ that are defined as follows

$$Q_{\max}(T) = \int_{-\infty}^{T} p_{\max}(T)dT$$

$$Q(T) = \int_{-\infty}^{T} p(T)dT$$

The relationships between the Qs and the ps are obvious. However, we only know $p(T)$ and therefore also $Q(T)$. $Q_{\max}(T)$ is the probability of sampling a $T_{\max}$ that is smaller than T. The probability that the maximum value of the set, $T_{\max}$, is less than a particular value, T, is the same as the probability that each member of the set - T_i is also smaller than T, that is

$$Q(T_{max} \le T) = \prod_i \left[Q(T_i \le T) \right]$$

In terms of the probability density, $p_{max}(T)$ $\left(Q(T_{max} \le T) = \int_{-\infty}^{T} p_{max}(T_{max}) dT_{max} \right)$, we can write

$$p_{max}(T) = \sum_i \left(\frac{dQ(T_i < T)}{dT_{max}} \right) \prod_{j \ne i} Q(T_j < T)$$

If all the $Q(T_j < T)$ are the same and are now denoted $Q(T)$, the expression is simplified to

$$p_{max}(T) = n \cdot p(T) \cdot Q(T)^{n-1}$$

To demonstrate that the new probability density for the maximum number, $p_{max}(T)$, is quite different from $p(T)$ let us consider a simple example. Let $p(T)$ be a constant, $1/L$, between 0 and L (a uniform probability density). Then $Q(T)$ is

$$Q(T) = \int^{T} p(T') dT' = \left(\frac{1}{L} \right) \cdot T$$

and $p_{max}(T)$ is

$$p_{max}(T) = \left(\frac{n}{L^n} \right) \cdot T^{n-1}$$

Note also that in contrast to our prior guess of a Gaussian distribution, the corresponding $p_{max}(T)$ if $p(T)$ is a Gaussian is **not** yet another Gaussian.

The probability density that we are really interested in (in the context of BLAST) is the geometric distribution. Here we only state the results of a (conceptually) similar analysis to what we did. Let T_{max} be the maximum of n random numbers distributed according to the geometric distribution. The probability of obtaining a random number T by chance that is larger than T_{max} is bound by the so-called extreme value distribution

$$\exp\left[-n \exp(-\lambda T) \right] \le P(T_{max} \le T) \le \exp\left[-n \exp\left(-\lambda (T+1) \right) \right]$$

This asymptotic formula is essentially the same formula we wrote BLAST

$$P(T > T_T) = 1 - e^{-y}$$

where $y = K \cdot m \cdot n \cdot \exp\left[-\lambda T_T \right]$

Sometimes we also encounter the E-value defined as, $E = -\log(1-p)$

This probability is also called the P-value. The smaller is the P-value, the more significant is the score (i.e. it is less likely to be obtained by chance). The parameter K is determined (approximately) by $K = (C/\bar{L})\exp(-\lambda)$, where C is the coefficient of the geometric distribution analogous to the estimate we made earlier $P(T_{\max} \geq T) = C\exp(-\log(q/p)\cdot T)$ and $\bar{L}$ is the typical length of the alignment between sequential maxima. We did not discuss the calculation of $\bar{L}$.

This concludes our brief description of the BLAST algorithm. To summarize, BLAST uses statistical theory to estimate what is the optimal score of two random sequences depending on the length of the alignment and the properties of the substitution matrix. Whatever score we obtain when aligning two real sequences it needs to be much higher than the score of random sequences in order to be significant. BLAST provides a theoretical estimate what are the chances that a random sequence will score the same. The searching for significant matching segments can be done efficiently using hash tables and related computer science techniques.

Use of multiple sequence alignments in signal enhancement

So far we discussed only alignments of pairs of sequences. There is significant information in multiple alignments of related proteins. For example, if a residue is conserved over a range of related sequence it is more likely to be important for the well being of that protein. On the other hand if a specific position in the sequence has amino acids all over the map (e.g. in ten sequences different amino acid is observed at that position) then this site along the sequence is expected to be less significant and should contribute little to the overall score of the alignment. It is suggestive to define an average score $\langle T \rangle$ such that

$$\langle T \rangle = \sum_{i,\alpha} p(i,\alpha)\, s(\alpha,\beta)$$

where $p(i,\alpha)$ is the probability of finding amino acid α at the i column of the multiple sequence alignment, and β is the amino acid from the database sequence we compare the multiple sequence alignment to. Alternative way of computing the score is

$$\langle T \rangle = \sum_{i,\beta} \log\left({p(i,\beta)}\Big/{p(\beta)} \right)$$

which is putting emphasis on the probability of observing amino acid β at a specific column.

We hope to estimate the above probability directly from the multiple sequence alignment.

A multiple sequence alignment will look something like

$$
\begin{array}{ccccc}
a_1 & \dots & a_k & \dots & a_n \\
b_1 & \dots & b_{k'} & \dots & b_{n'} \\
c_1 & \dots & c_{k''} & \dots & c_{n''} \\
d_1 & \dots & - & \dots & d_m \\
- & \dots & e_l & \dots & e_{m'}
\end{array}
$$

We do not discuss here how the multiple sequence alignment was obtained and assume that it is given. Multiple sequence alignment is actually a hard problem that we shall discuss later. Typically we are able to find and align an order of 10 different sequences. It is clear that we will suffer from a severe sampling problem. Since there are twenty amino acids it is impossible that the limited sampling described above will yield frequencies that are good approximation top the true probabilities. For example, it is possible that amino acid F will not appear at all at a given column. This will immediately creates a downgrading for a novel sequence that includes F in that position.

It is possible to overcome (partially) the under sampling problem by using the "null" hypothesis. Adding more statistics from a known distribution of amino acids not necessarily related to the sequences at hand. We compute the probability $p(i,\alpha)$ as

$$
p(i,\alpha) = \frac{N_i}{N_i + B_i} \cdot \frac{n_{i\alpha}}{n_i} + \frac{B_i}{N_i + B_i} \cdot \frac{b_{i\alpha}}{B_i}
$$

where B_i is the total number of pseudo-counts at column i and $b_{i\alpha}$ is total number of pseudo count at column i of amino acid α. Similarly N_i (and $n_{i\alpha}$) are the actual numbers of sequences (and amino acid type α) we have in the multiple sequence alignment at column i. The pseudo counting parameters are unknown.

The most straightforward approach of estimating $b_{i\alpha}$ is $b_{i\alpha} = p(\alpha) \cdot B_i$. Hence, we are getting $p(\alpha)$ from the known (general) distribution of amino acids. This choice is not optimal since it is not using at all the information we have so far. It is true, the information is limited, but it is still more than zero. A possible way of generating pseudo counts is

$$
b_{i\alpha} = B_i \sum_{\beta} p(\alpha,\beta) p(i,\beta)
$$

The probability, $p(i,\beta)$, is computed directly from the multiple sequence alignment. It is the raw frequencies extracted from the limited number of sequences that we have. The raw frequencies are multiplied by a conditional probability of pairs of amino acids, $p(\alpha,\beta)$, which is extracted (for example) from the BLOSUM matrix. The substitution probabilities of the BLOSUM matrix are not zero, and therefore the probability of observing any amino acid will not be zero. Though, in principle, some of the amino acids will be highly unlikely. For example if we have only W at column i, the probability of

observing R will be particularly small. The proposed way of generating pseudo-counts is attractive since it is using the known statistics of amino acids to generate additional counts that we were likely to miss.

How should we handle the total number of pseudo counts, B_i? We have a number of expectations. For example, if we have a LOT of data then B_i should decreases. Also if there is a great diversity of amino acids at a given column then pseudo counts are more important. However, if we get ten times exactly the same amino acid, it is less likely that we miss something and that we need to generate a lot of pseudo-counters.

A common sense choice is $B_i = N \cdot V_i$, where N is an empirical constant and V_i is the measure of amino acid diversity at position i.

	Type	Hits	Search Text	DBs	Time Stamp	Comments
1	BRS	2	"20030004780"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 07:57	
2	IS&R	2	("5568399").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 07:57	
3	IS&R	2	("6259972").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 07:57	
4	BRS	16	user$1 with interface with graphical and select$3 with parameter$1 with (value$1 or data) with software with operat$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:20	
5	BRS	3	user$1 with interface with graphical and select$3 with parameter$1 with (value$1 or data) with test$3 with software with operat$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:19	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
6	BRS	0	user$1 with interface with graphical and (max$5 or combin$5) with select$3 with parameter$1 with (value$1 or data) with test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:19	
7	BRS	3	user$1 with interface with graphical and select$3 with parameter$1 with (value$1 or data) with software with operat$3 and (combin$5 or max$5) with parameter$1 with (value$1 or data)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:23	
8	BRS	1	user$1 with interface with graphical and (combin$5 or max$5) with parameter$1 with value$1 same test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:25	
9	BRS	0	user$1 with interface with graphical and (combin$5 or mix$5) with parameter$1 with value$1 same test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:26	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
10	BRS	38	user$1 with interface with graphical and (combin$5 or mix$5) with parameter$1 with value$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:26	
11	BRS	45	user$1 with interface with graphical and (combin$6 or mix$5) with parameter$1 with value$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:26	
12	BRS	45	user$1 with interface with graphical and (combin$6 or mix$6) with parameter$1 with value$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:26	
13	BRS	1	user$1 with interface with graphical and (combin$6 or mix$6) with parameter$1 with value$1 same test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:31	
14	BRS	9	user$1 with interface with graphical same test$3 with software and (combin$6 or mix$6) with parameter$1 with value$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:28	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
15	BRS	0	user$1 with interface with graphical same probabilit$3 with parameter$1 and (combin$6 or mix$6) with parameter$1 with value$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:32	
16	BRS	0	user$1 with interface with graphical same probabilit$3 with curve$1 and (combin$6 or mix$6) with parameter$1 with value$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:32	
17	BRS	0	(GUI or (user$1 with interface with graphical)) and probabilit$3 with curve$1 and (combin$6 or mix$6) with parameter$1 with value$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:47	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
18	BRS	0	(GUI or (user$1 with interface with graphical)) and probabilit$3 with curve$1 and (combin$6 or mix$6) with parameter$1 with value$1 and test$3 with (software$1 or program$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:33	
19	BRS	78	(GUI or (user$1 with interface with graphical)) and probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:33	
20	BRS	5	(GUI or (user$1 with interface with graphical)) and probabilit$3 with curve$1 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:33	
21	BRS	2	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with parameter$1 with value$1 with test$3 same software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:54	
22	BRS	0	probabilit$3 with (curve$1 or plot$3) and (combin$6 or mix$6) with parameter$1 with value$1 with test$3 same software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:44	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
23	BRS	0	probabilit$3 with function$1 and (combin$6 or mix$6) with parameter$1 with value$1 with test$3 same software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:44	
24	BRS	0	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with (minimum with maximum) with test$3 same software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:56	
25	BRS	0	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with (minimum with maximum) same test$3 with software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:18	
26	BRS	60	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with (minimum with maximum) and test$3 with software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:59	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
27	BRS	0	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with (minimum with maximum) and test$3 with software$1 and probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:58	
28	BRS	5	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with (minimum with maximum) and test$3 with software$1 and probabilit$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 08:58	
29	BRS	0	717/124.ccls. and (GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with (minimum with maximum) and test$3 with software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:01	
30	BRS	5	717/124.ccls. and (GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with ((minimum with maximum) or parameter$1) and test$3 with software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:00	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
31	BRS	468	717/124.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:01	
32	BRS	317	702/181.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:02	
33	BRS	5	717/124.ccls. and (GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with ((minimum with maximum) or parameter$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:03	
34	BRS	0	(GUI or (user$1 with interface with graphical)) with probabilit$3 with curve$1 with minimum with maximum	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:34	
35	BRS	0	(GUI or (user$1 with interface with graphical)) with probabilit$3 with curve$1 with minimum with maximum with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:19	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
36	BRS	1	(GUI or (user$1 with interface with graphical)) same adjustable with probabilit$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:22	
37	BRS	0	(GUI or (user$1 with interface with graphical)) and adjustable with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:23	
38	BRS	4	(GUI or (user$1 with interface with graphical)) and adjust$4 with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:24	
39	BRS	0	test$3 with software$1 same parameter$1 with value$1 with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:26	
40	BRS	0	test$3 with software$1 and parameter$1 with value$1 with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:27	
41	BRS	2	(GUI or (user$1 with interface with graphical)) and parameter$1 with value$1 with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:28	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
42	BRS	2	parameter$1 with value$1 with minimum with maximum with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:29	
43	BRS	45	parameter$1 with value$1 with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:31	
44	BRS	0	test$3 with software$1 with parameter$1 with value$1 and probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:34	
45	BRS	115	(GUI or (user$1 with interface with graphical)) with display$3 with input with icon	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:36	
46	BRS	0	("345"/$.ccls. or "382"/$.ccls.) and (GUI or (user$1 with interface with graphical)) with display$3 with drag$3 with input with icon$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:37	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
47	BRS	4	("345"/$.ccls. or "382"/$.ccls.) and (GUI or (user$1 with interface with graphical)) and display$3 with drag$3 with input with icon$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:42	
48	BRS	29	(GUI or (user$1 with interface with graphical)) and display$3 with drag$3 with input with icon$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:42	
49	BRS	1	test$3 with software$1 and (GUI or (user$1 with interface with graphical)) and display$3 with drag$3 with input with icon$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:44	
50	BRS	0	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with parameter$1 with probabilit$3 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:48	
51	BRS	1	(GUI or (user$1 with interface with graphical)) and (combin$6 or mix$6) with parameter$1 with probabilit$3 and test$3 same software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 09:48	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
52	BRS	384	"714"/$.ccls. and software adj module	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 13:01	
53	BRS	9	"714"/$.ccls. and testing adj software adj module	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 13:09	
54	BRS	20	"714"/$.ccls. and test$3 adj software adj module$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 13:20	
55	BRS	65	test$3 adj software adj module$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 13:21	
56	BRS	2	"20020033186"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/02/03 13:47	
57	IS&R	2	("6714952").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/06/25 13:44	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
58	BRS	2	"20050096867"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/06/25 13:44	
59	BRS	2	"20050096867"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:49	
60	BRS	472	probability adj1 functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:51	
61	BRS	2	probability adj1 functions with test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:52	
62	BRS	2	probability adj1 function with test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:52	
63	BRS	3	probability adj1 function$1 with test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:54	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
64	BRS	1	convert with probability with function$1 with test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:54	
65	BRS	1	convert$3 with probability with function$1 with test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:54	
66	BRS	1	convert$3 with probability with function$1 same test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:55	
67	BRS	8	convert$3 with probability with function$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:58	
68	BRS	9	convert$3 with probabilit$3 with function$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 16:58	
69	BRS	1	convert$3 with probabilit$3 with function$1 and test$3 with software not S92	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:00	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
70	BRS	19	convert$3 same probabilit$3 with function$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:00	
71	BRS	6	convert$3 same probabilit$3 with function$1 and test$3 with software and input with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:03	
72	BRS	20	convert$3 with probabilit$3 with function$1 and user$1 with graphical	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:03	
73	BRS	2	convert$3 with probabilit$3 with function$1 and user$1 with graphical and test$3 with software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:04	
74	BRS	2	convert$3 with probabilit$3 with function$1 and user$1 with graphical and test$3 same software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:04	
75	BRS	83	probabilit$3 with function$1 and user$1 with graphical and test$3 same software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:04	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
76	BRS	3	convert$3 same probabilit$3 with function$1 and user$1 with graphical and test$3 same software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:05	
77	BRS	20	convert$3 with probabilit$3 with function$1 and user$1 with graphical and software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:06	
78	BRS	2	convert$3 with probabilit$3 with function$1 and user$1 with graphical and software$1 and parameter$1 with test$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:06	
79	BRS	2	convert$3 with probabilit$3 with function$1 and user$1 with graphical and software$1 and parameter$1 same test$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:06	
80	BRS	8	convert$3 same probabilit$3 with function$1 and user$1 with graphical and software$1 and parameter$1 same test$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:11	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
81	BRS	595	combin$5 with probabilit$3 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:11	
82	BRS	2	combin$5 with probabilit$3 with function$1 and convert$3 with probabilit$3 with function$1 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:12	
83	BRS	42	combin$5 with probabilit$3 with function$1 and convert$3 with probabilit$3 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:15	
84	BRS	5	combin$5 with probabilit$3 with function$1 and convert$3 with probabilit$3 with function$1 and test$3 same (software$1 or program$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:15	
85	BRS	5	(mix$4 or combin$5) with probabilit$3 with function$1 and convert$3 with probabilit$3 with function$1 and test$3 same (software$1 or program$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:16	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
86	BRS	45	(mix$4 or combin$5) with probabilit$3 with function$1 and convert$3 with probabilit$3 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:16	
87	BRS	18	(mix$4 or combin$5) with probabilit$3 with function$1 and convert$3 with probabilit$3 with function$1 and (graphical or UGI)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:18	
88	BRS	16	(mix$4 or combin$5) with probabilit$3 with function$1 and convert$3 with probabilit$3 with function$1 and (graphical or UGI) and input with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:23	
89	BRS	17	((user with graphical with interface) or UGI) with display with list with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:25	
90	BRS	0	((user with graphical with interface) or UGI) with display with list with parameter$1 and test$3 with softwar	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:25	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
91	BRS	2	((user with graphical with interface) or UGI) with display with list with parameter$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:25	
92	BRS	110	((user with graphical with interface) or UGI) with display with parameter$1 and test$3 with software	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:26	
93	BRS	2	((user with graphical with interface) or UGI) with display with parameter$1 and test$3 with software and drag$4 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/07 17:28	
94	BRS	4	display$3 with list with parameter$1 and test$3 with software and drag$4 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:00	
95	BRS	27	"702"/$.ccls. and (tsai.xa. or tsai.xp.) and computer and test$3 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:01	
96	BRS	6	"702"/$.ccls. and (tsai.xa. or tsai.xp.) and computer with test$3 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:02	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
97	BRS	2	"702"/$.ccls. and (tsai.xa. or tsai.xp.) and software with test$3 same input with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:02	
98	BRS	4	"702"/$.ccls. and (tsai.xa. or tsai.xp.) and computer with test$3 same input with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:03	
99	BRS	2	"702"/$.ccls. and (tsai.xa. or tsai.xp.) and software with test$3 same input with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:03	
100	BRS	8	"702"/$.ccls. and (tsai.xa. or tsai.xp.) and software with test$3 and input with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:05	
101	BRS	10	software with module$1 with test$3 and input with parameter$1 with combin$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:09	
102	BRS	326	714/24.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2005/07/08 12:10	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
103	BRS	2	"20050096867"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 09:47	
104	BRS	14462	select$3 with input$4 with (parameter$1 or arguement$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:00	
105	BRS	185	(GUI or graphical adj user$1 adj interface) with select$3 with input$4 with (parameter$1 or arguement$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:22	
106	BRS	8	(GUI or graphical adj user$1 adj interface) with select$3 with input$4 with (parameter$1 or arguement$1) and probabilit$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:01	
107	BRS	2952	(GUI or graphical adj user$1 adj interface) with select$3 with input$4 with (parameter$1 or arguement$1) and adjust$3 probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:02	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
108	BRS	0	(GUI or graphical adj user$1 adj interface) with select$3 with input$4 with (parameter$1 or arguement$1) and (tun$4 or compensat$3 or adjust$3 or calibrat$3) with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:09	
109	BRS	1	(GUI or graphical adj user$1 adj interface) same select$3 with input$4 with (parameter$1 or arguement$1) and (tun$4 or compensat$3 or adjust$3 or calibrat$3) with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:03	
110	BRS	1	(GUI or graphical adj user$1 adj interface) same select$3 with input$4 with (parameter$1 or arguement$1) and (tun$4 or compensat$3 or adjust$3 or calibrat$3) same probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:03	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
111	BRS	1	(GUI or graphical adj user$1 adj interface) same select$3 with input$4 with (parameter$1 or arguement$1) and probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:04	
112	BRS	19	(GUI or graphical adj user$1 adj interface) same select$3 with input$4 with (parameter$1 or arguement$1) and probabilit$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:04	
113	BRS	4	(GUI or graphical adj user$1 adj interface) same select$3 with input$4 with (parameter$1 or arguement$1) and probabilit$3 and curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:06	
114	BRS	1	(GUI or graphical adj user$1 adj interface) with probabilit$3 with curve$1 and select$3 with input$4 with (parameter$1 or arguement$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:07	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
115	BRS	2	(GUI or graphical adj user$1 adj interface) with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:07	
116	BRS	2	(GUI or graphical adj user$1 adj interface) same probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:07	
117	BRS	94	(GUI or graphical adj user$1 adj interface) and probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:07	
118	BRS	6	(GUI or graphical adj user$1 adj interface) and (tun$4 or compensat$3 or adjust$3 or calibrat$3) with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:09	
119	BRS	6	(GUI or graphical adj user$1 adj interface) and (tun$4 or compensat$3 or adjust$3 or calibrat$3 or modify$3) with probabilit$3 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:12	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
120	BRS	2	(GUI or graphical adj user$1 adj interface) and probabilit$3 with curve$1 with mathematical with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:28	
121	BRS	1	(GUI or graphical adj user$1 adj interface) same probabilit$3 with curve$1 with values	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:28	
122	BRS	0	(GUI or graphical adj user$1 adj interface) and probabilit$3 with curve$1 with values with icon$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:28	
123	BRS	15	(GUI or graphical adj user$1 adj interface) and probabilit$3 with curve$1 with values	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:31	
124	BRS	14	convert$3 with probabilit$3 with curve$1 with probabilit$3 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:38	
125	BRS	1	(combin$3 or mix$4) with probabilit$3 with curve$1 with combination with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:35	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
126	BRS	2	convert$3 with probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:58	
127	BRS	86	probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:38	
128	BRS	86	probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:43	
129	BRS	0	input$4 with (parameter$1 or arguement$1) with probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:39	
130	BRS	1	test$3 with software and input$4 with (parameter$1 or arguement$1) and probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:40	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
131	BRS	3	test$3 with input$4 with (parameter$1 or arguement$1) and probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:40	
132	BRS	21	input$4 with (parameter$1 or arguement$1) and probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:41	
133	BRS	2	test$3 with software$1 and probabilit$3 with curve$1 with probabilit$3 with functions	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:44	
134	BRS	12	test$3 with software$1 and probabilit$3 with curve$1 with probabilit$3 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:47	
135	BRS	34	probabilit$3 with curve$1 with probabilit$3 with function$1 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:45	
136	BRS	14	convert$3 with probabilit$3 with curve$1 with probabilit$3 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:59	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
137	BRS	14	convert$3 with probabilit$3 with curve$1 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:59	
138	BRS	2	convert$3 with probabilit$3 adj curve$1 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 10:59	
139	BRS	48	convert$3 with probabilit$3 adj function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:00	
140	BRS	5	convert$3 with probabilit$3 adj curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:01	
141	BRS	5	convert$3 with probabil$5 adj curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:01	
142	BRS	40	convert$3 with probabil$5 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:01	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
143	BRS	14	convert$3 with probabil$5 with curve$1 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:03	
144	BRS	3	input$4 with parameter$1 and convert$3 with probabil$5 with curve$1 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:03	
145	IS&R	2	("6714952").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:16	
146	BRS	0	(GUI or graphical adj user$1 adj interface) with test$3 with software with paramter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:23	
147	BRS	21	(GUI or graphical adj user$1 adj interface) with test$3 with software with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:26	
148	BRS	1	(GUI or graphical adj user$1 adj interface) with test$3 with software with parameter$1 and input$4 with icon$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:24	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
149	BRS	6	(GUI or graphical adj user$1 adj interface) with test$3 with software with parameter$1 and display$3 with parameters	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:28	
150	BRS	3	(GUI or graphical adj user$1 adj interface) with test$3 with software with parameter$1 and drag$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/13 11:28	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
151	IS&R	50	(("6372898") or ("5794008") or ("4354177") or ("4862506") or ("4868785") or ("4926426") or ("5253363") or ("5444401") or ("5644497") or ("5661733") or ("5692502") or ("5731992") or ("5878054") or ("5982683") or ("5999013") or ("6012147") or ("6064721") or ("6148427") or ("6188402") or ("6249882") or ("6269318") or ("6271014") or ("6277959") or ("6292830") or ("6326472") or ("6385300") or ("6416973") or ("6419629") or ("4561093") or ("6105155") or ("5784299") or ("5878375") or ("5991910") or ("4375676") or ("4414669") or ("4459695") or ("4481608") or ("4489414") or ("4525673") or ("4782281") or ("4912624") or ("5307443")	USPAT	2006/01/19 16:03	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
152	BRS	3	generat$3 with list with parameter$1 with (max$6 or combination$1) with select$3 with parameter$1 with value$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:06	
153	BRS	15	generat$3 with list with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:06	
154	BRS	21	generat$3 with list$3 with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:06	
155	BRS	6	generat$3 with list$3 with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1 and probabilit$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:08	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
156	BRS	2	generat$3 with list$3 with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1 and probabilit$3 and function$1 with probabilit$3	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:09	
157	BRS	2	generat$3 with list$3 with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1 and probabilit$3 with (max$6 or combination$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:09	
158	BRS	4	generat$3 with list$3 with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1 and probabil$6 same (max$6 or combination$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:12	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
159	BRS	8	generat$3 with list$3 with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1 and test$3 with software$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:16	
160	BRS	3	generat$3 with list$3 with parameter$1 with (max$6 or combination$1) and select$3 with parameter$1 with value$1 and (GUI or graphical with user with interface)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:16	
161	IS&R	2	("6714952").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:34	
162	BRS	0	probabilit$3 with curve$1 with probabilit$3 with function$1 with parameter$1 and API	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:45	
163	BRS	4	probabilit$3 with curve$1 and probabilit$3 with function$1 with parameter$1 and API	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:46	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
164	BRS	10	probabilit$3 with curve$1 and probabilit$3 with function$1 and (combin$6 or mix$6) with parameter$1 and API	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:50	
165	BRS	0	convert$3 with probabilit$3 with curve$1 with function$1 and (combin$6 or mix$6) with parameter$1 and API	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:51	
166	BRS	2	convert$3 with probabilit$3 with curve$1 with function$1 and (combin$6 or mix$6) with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:51	
167	BRS	14	convert$3 with probabilit$3 with curve$1 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:48	
168	BRS	2	convert$3 with probabilit$3 with curve$1 with function$1 and select$3 with parameter$1 with (mix$6 or combin$6)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 16:55	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
169	BRS	6	select$3 with parameter$1 with (mix$6 or combin$6) with (predetermined or predefined) with probabil$7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:02	
170	BRS	2	(GUI or graphical with user with interface) with probabi$7 with curves	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:03	
171	BRS	2	(GUI or graphical with user with interface) same probabi$7 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:03	
172	BRS	110	(GUI or graphical with user with interface) with probabi$7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:03	
173	BRS	8	(GUI or graphical with user with interface) with probabi$7 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:04	
174	BRS	1	(GUI or graphical with user with interface) with probabi$7 with input$4 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:05	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
175	BRS	35	(GUI or graphical with user with interface) and probabi$7 with input$4 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:06	
176	BRS	1	(GUI or graphical with user with interface) same probabi$7 with input$4 with parameter$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:35	
177	BRS	2	convert$3 with probabilit$3 with curve$1 with function$1 and (GUI or graphical with user with interface)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:50	
178	BRS	2	convert$3 with probabilit$3 with curve$1 with function$1 and graphical same user with interface	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:49	
179	BRS	2	convert$3 with probabilit$3 with curve$1 same function$1 and (GUI or graphical with user with interface)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:49	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
180	BRS	2	convert$3 same probabilit$3 with curve$1 with function$1 and (GUI or graphical with user with interface)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:50	
181	BRS	2	convert$3 same probabilit$3 with curve$1 and (GUI or graphical with user with interface)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:50	
182	BRS	14	convert$3 with probabilit$3 with curve$1 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:51	
183	BRS	6	convert$3 with probabilit$3 with curve$1 with function$1 and graphic$4	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:51	
184	BRS	7	convert$3 with probabilit$3 with curve$1 with function$1 and computer	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/19 17:51	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
185	BRS	10	(GUI or graphical with user$1 with interface) same select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and test$3 with (software or hardware)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 11:20	
186	BRS	2	(GUI or graphical with user$1 with interface) same select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and test$3 with (software or hardware) and probabi$5	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 11:21	
187	BRS	2	(GUI or graphical with user$1 with interface) same select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and test$3 with (software or hardware) and probabi$7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 11:21	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
188	BRS	15	(GUI or graphical with user$1 with interface) same select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and probabi$7	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 11:21	
189	BRS	1	(GUI or graphical with user$1 with interface) same select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and probabi$7 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 11:22	
190	BRS	21	(GUI or graphical with user$1 with interface) and select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and probabi$7 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 11:22	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
191	BRS	3	(GUI or graphical with user$1 with interface) and select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and probabi$7 with curve$1 with function$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:39	
192	BRS	0	(GUI or graphical with user$1 with interface) with display3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:40	
193	BRS	0	(GUI or graphical with user$1 with interface) and display3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:40	
194	BRS	125	(GUI or graphical with user$1 with interface) with display$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:41	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
195	BRS	64	(GUI or graphical with user$1 with interface) with display$3 with input$4 with (parameters or arguements) with (value$1 or data)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:42	
196	BRS	8	(GUI or graphical with user$1 with interface) with display$3 with input$4 with (parameters or arguements) with (value$1 or data) and test$3 with (software or hardware)	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:44	
197	BRS	10	(GUI or graphical with user$1 with interface) with display$3 with input$4 with (parameters or arguements) with (value$1 or data) and input$4 with icon$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:44	
198	BRS	2	"20050210085"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:56	

	Type	Hits	Search Text	DBs	Time Stamp	Comments
199	BRS	1	(GUI or graphical with user$1 with interface) same select$3 with input$4 with (parameter$1 or arguement$1) with (value$1 or data) and probabi$7 with curve$1	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 14:57	
200	BRS	3	"6829731"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 15:02	
201	BRS	2	"20040199444"	US-PGPUB; USPAT; EPO; JPO; DERWENT; IBM_TDB	2006/01/20 15:02	

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